

COAL AGE

*Devoted to the Operating, Technical and
Business Problems of the
Coal Mining Industry*

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A New Year Inventory

SOUND ENGINEERING and sound economics have always been closely allied. But seldom, if ever, has that interrelation been more apparent than it is in the coal industry on the threshold of the new year. Out of the trials and the disasters of the last decade—the vanished peaks of unhealthy prosperity and the deep valleys of sickly depression—are coming a clearer understanding of the basic problems facing the industry and a clearer vision of the paths in which their solution lies.

CONCRETE EVIDENCE of physical progress and mental clarification is at hand. Despite tremendous initial difficulties in fitting equipment to the job, personnel and prejudice, underground mechanization has made such rapid strides that its continued advancement is no longer questioned. The principles of underground mechanization have won general acceptance: the problem now is one of adaptation to individual working conditions, and the attack upon problems which either grow directly out of or have been intensified by the wider use of the loading machine.

FOREMOST among these latter problems is that of mechanical preparation. It was early recognized that the introduction of the loading machine underground transferred

the burden of the responsibility for clean coal to the topworks. The primary purpose of the loading machine is to increase tonnage. Any attempt to slow up its work at the face by the selective rejection of impurities demanded under hand-loading methods would defeat that purpose.

EVEN at those mines where underground mechanization has not yet forced changes in topworks preparation practices the relentless pressure of competition is making improvement imperative. The consumer, with literally hundreds of shippers clamoring for his business, is in a position to insist upon coal sized and cleaned to specifications. It is a legitimate demand for service which the industry must and should meet.

LOWER COSTS and better products are the watchwords of modern American industrialism. The old shibboleth of quality output—"not how cheap, but how good"—has given way to the slogan of mass production—"quality goods at quantity prices." Mechanization underground means lower production costs; mechanical cleaning on top means a better product. These are the contributions which sound engineering is making to the coal industry today. To sound economics must be left the task of seeing that sound engineering is adequately rewarded.



The Dump, Seraing

*From an Etching by
Joseph Pennell*

Courtesy Kennedy & Co., N. Y.

Basic Conditions Assure Continued Prosperity In American Industry

BY ROBERT M. DAVIS

Statistical Editor
McGraw-Hill Publishing Co.

AMERICAN business has just reached the end of a twelve-month period which has been economically in many ways the most outstanding period in its history, and it faces the future with the utmost confidence. The year just closed witnessed record operations in almost every manufacturing group, especially during the last half of the year. General construction exceeded 1927 by over 14 per cent; general employment reached record proportions; the average weekly earnings of wage earners at the close of the year was the highest since 1920; corporation earnings advanced materially over 1927; retail trade exceeded that of the preceding year by wide margins, and the purchasing power of the American people, both urban and rural, gained substantially. The year ended with industrial and general business activity above the estimated normal, a condition which was maintained practically throughout the entire year.

Many factors presage that whatever the course of business may be during the year 1929 as a whole, the first quarter of the year is almost certain to witness business and industrial activity of unusual proportions. There are five outstanding favorable factors underlying the outlook as the new year opens. First is the election of Mr. Hoover. The election still maintains a lead as a favorable factor in the estimation of American executives because the administration will be unchanged for the next four years. Settlement of the political situation dispels the uncertainty which has prevailed during the year, an uncertainty which of itself necessarily hampered business. Corporation and large industries can

now make their plans with certainty not only for next year but for the next four years, for they can see a continuance of prosperity with an economist and business leader at the helm.

The general optimism and confidence in the future which prevails throughout the country is another propitious element. The psychological effect of such general confidence in future prosperity is most favorable. At the center of this confidence is Mr. Hoover. The forthcoming administration promises to be essentially sound from a business standpoint. This mental state of the nation alone gives to all business a hope and optimism which foreshadow progress and prosperity.

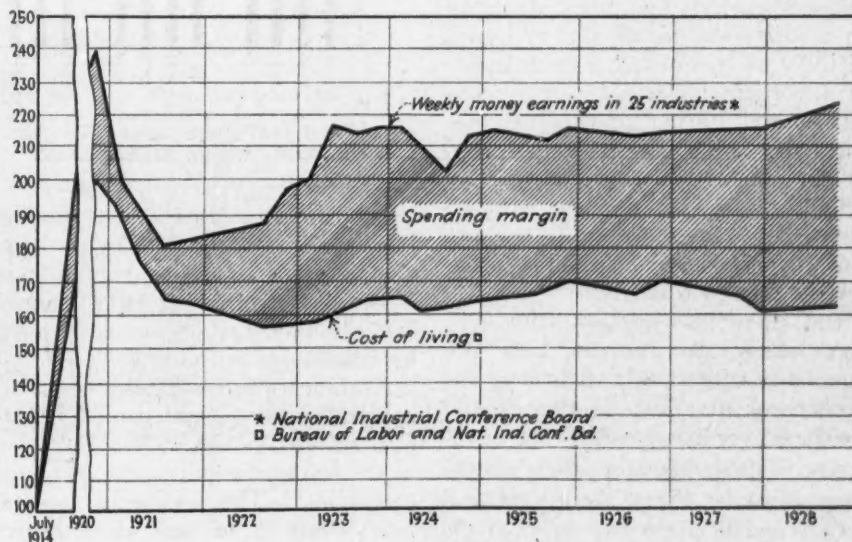
The third favorable factor is the materially improved agricultural situation. With Mr. Hoover in the White House the farmers see strong

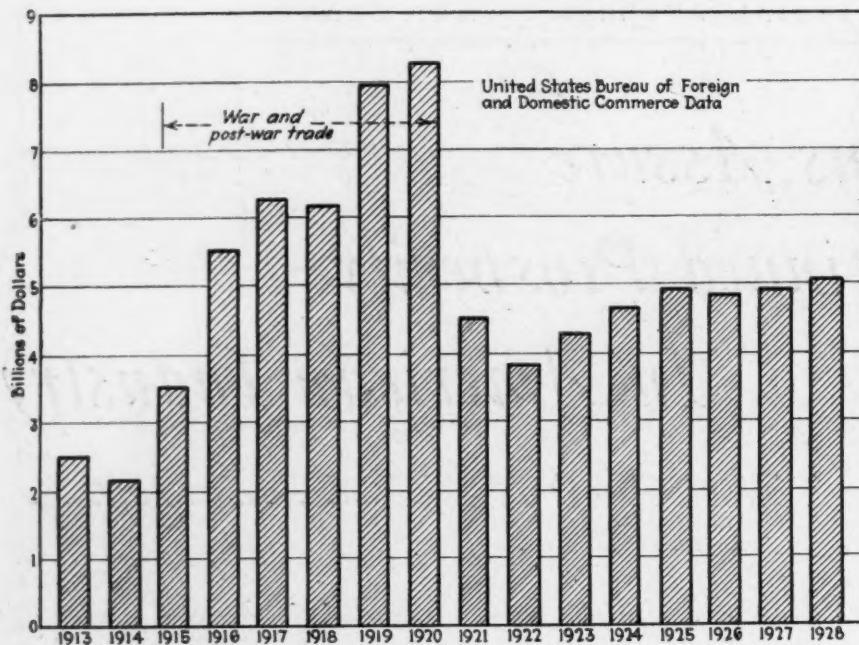
hope of farm relief, which with abundant crops and fair prices will mean even more satisfactory conditions. The agricultural situation is computed by the Standard Statistics Co. to be on the most profitable basis for a decade. It is estimated that the value of the nine leading farm products for 1928 is 5.9 per cent greater than in 1927. The profit margin, however, has increased even more, as costs have been reduced through the liquidation of old debts and the greater use of labor-saving machinery.

Fourth in importance among the factors promising a continuance of present prosperous conditions is the decrease in unemployment and a continued upward trend in wages with the cost of living remaining about stationary, resulting in a widely distributed high consumer purchasing power.

The record manufacturing operations of the past year have been balanced by a ready demand from the consumer, a demand which has been

Spending Margin of the American People
Increased Still Further During 1928





even stronger with the enhanced position of the American farmer. According to the latest data of the National Industrial Conference Board, the present purchasing power of the nation as a whole in deflated dollars, or real purchasing power, is 55 per cent over that of 1909 and in current dollars is 173 per cent over 1909. The increase in real purchasing power per capita is 20 per cent over 1909 and that of the gainfully employed is 35 per cent over 1909.

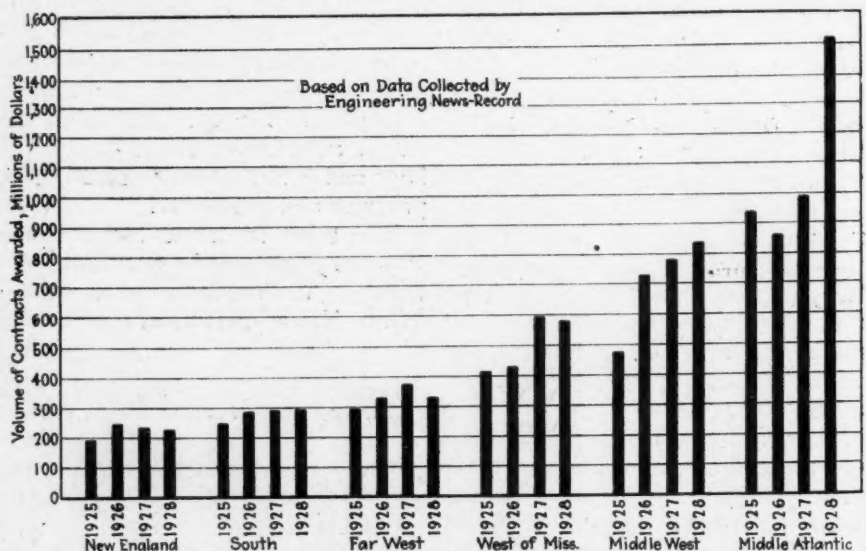
The fifth important factor is the maintenance throughout the distribution branches of business of minimum inventories and quick turnover. Small stocks are in the hands of both wholesalers and manufacturers, which condition presages a fairly constant volume of business during the next three months at least.

Other favorable factors on the horizon as the year opens are materially improved conditions in several industries which had been operating on a low scale during the first part of the year just closed, a continuance of favorable underlying credit conditions even during a period of comparatively high money rates, continued high general construction activities, growing exports with an increasingly favorable trade balance, and a continuance of economic progress in foreign countries.

But there also are economic factors which are fraught with the possibility of seriously disturbing the even tenor of affairs if they should continue over an extended time or increase in their influence. First among these must be placed the speculation frenzy and skyrocketing trend of the

Exports of American Products Have Increased by 34 Per Cent Since 1922

stock market. The fact that the stock market is so unstable seems to indicate possible fluctuations in business conditions, and many thinking men fear that a break in the stock market might cause financial unsettlement. Not only has the selling of stocks at



General Construction Shows Greatest Gains in the Middle Atlantic States

inflated prices caused a high interest rate, which must be paid by business men, but the extensive gambling in stocks has diverted into the financial districts money which should be used for productive purposes.

Entrance into the family of stockholders by the general run of American citizens, however, is a reflection of the confidence in present economic conditions. The feeling is general that American business and industry

are entering an era of prosperity such as has never before been known. If this belief is borne out, the leading corporations of the country will enjoy increased earnings and larger profits, which means more money with which to pay dividends. These increased earnings the public is anxious to share, and the desire is reflected in the growing interest in capital stock ownership.

Another unfavorable factor as the year opens is the keener competition which is prevalent throughout the distribution field. The tremendous growth of chain stores and mail-order houses is beginning to affect numerous businesses and selling channels through keen competition. Competition is generally becoming of the cut-throat variety as retail establishments are increasing at an even more rapid rate than the advance in population. This close competition cuts the margin profit as prices are continually slashed.

High money rates as a direct result of stock speculation are prevalent all over the country, forming a third adverse economic influence. Money is held tightly and is high for current business and building operations. But while authorities

seem to agree that probabilities at this time favor the continuance of firm money next year, they also believe that ample resources for further credit expansion exist in the Federal Reserve system. There is every reason to believe that there will be no lack of credit, though the rates at which it will be obtainable remain at or near present levels.

It is certain that as long as there is still room for credit expansion any slowing up of business and industry for the purpose of readjustment will be but temporary. If these more or

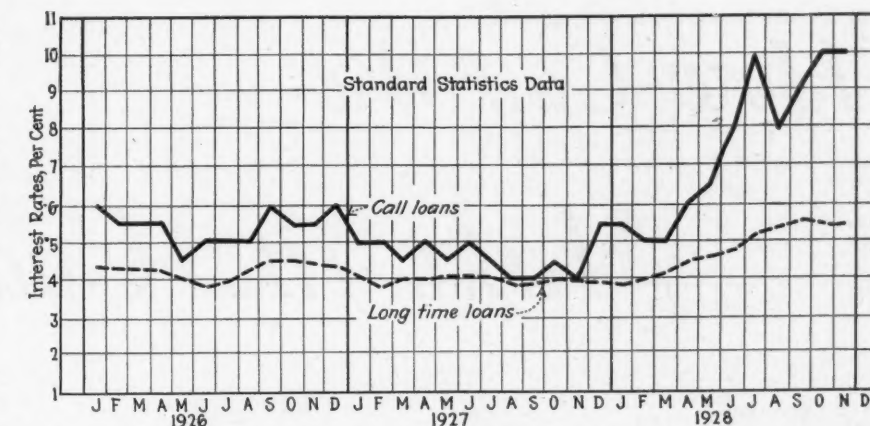
less high money rates continue, however, there is strong possibility that the operations of business and industry during 1929 will be slightly under those of 1928. It is regarded as a certainty also that the rate of each twelve-month gain in business operations during the coming year will not be as high as was recorded in 1928, especially during the second half of the year.

One of the chief complaints of business men is the general trend of cutting prices to increase volume, this practice in the end decreasing profits, and this trend must be regarded as a fourth unfavorable factor as the year opens. This type of competition is causing many manufacturers to operate at a loss.

Other unfavorable factors are the depressed conditions in some of the basic industries such as coal and shipping, the incomplete agricultural recovery, excessive installment buying, selling and distribution costs, and the readjustments resulting from the mechanization of general industry.

IN addition to these outstanding favorable and unfavorable economic factors which bear so heavily on the future operations of American business and industry there are other phases of business which have a large place in the current thinking of business executives. All business men are interested in profits—how to carry on production to show the greatest profit and to get away from volume business at little or no profit. This "profitless prosperity" is viewed with alarm by manufacturers who see their prices cut and volume increasing, but profit margin slight.

There is no doubt, however, that the earnings of corporations during the later part of 1928 were materially better than during the same period in 1927. The earnings of 165 corporations in the third quarter of 1928

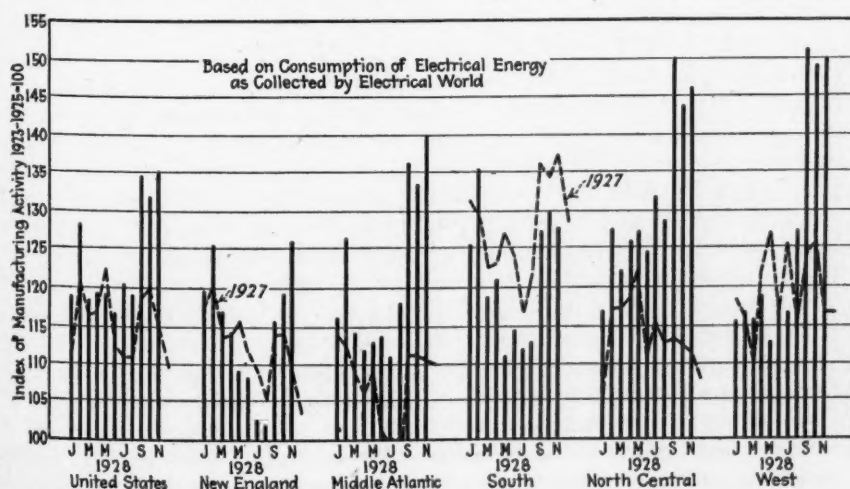


High Money Rates a Reflection of Frenzied Stock Speculation

were 32.4 per cent above the earnings of the same period in 1927, and practically any well assorted industrial group recorded earnings above 5 per cent over 1927. The earnings of corporations in each of the first three quarters of 1928 showed a progressively increasing percentage of gain over the corresponding quarter of 1927.

Some of the remarkable gains made during the third quarter as compared with over the same period in 1927 are as follows: Copper group, 117 per cent; motor equipment, 162 per cent; automobiles, 25 per cent; petroleum, 126 per cent; retail chain stores, 21 per cent; chemicals, 12 per cent; machinery and machine tools, 70 per cent; iron and steel, 51 per cent; food, 7 per cent, and building materials, 15 per cent. Since the fourth quarter of 1927 witnessed a serious decline in earnings, it is certain, with the known record industrial activity of the past few months as a background, that the 12-month gain in earnings during the last quarter of 1928 far exceeded any previous quarter in the year.

All Sections of the Nation Report Increased Operations During 1928 Over 1927



The growing tendency toward group ownership consolidation and mergers also is receiving much serious consideration of American business men. Consolidations are having a noticeable effect on present business practices and new economic problems are arising out of these vast mergers of interests. Retailers are giving close attention to the effect of chain-store systems upon the old type local stores which give local store service and credit. The tendency toward amalgamation and the elimination of all middlemen is bringing the consumer into closer relation to the manufacturer and tending to cut the spread between production cost and ultimate selling price.

BUSINESS men as a whole are keenly interested in the tariff question in all its phases. Many believe that in the revision of the tariff schedules lies a method of maintaining present-day living standards, and a protective tariff is demanded for farm products as well as for textiles, leather and woollens.

The various industrial groups face the near future with varying degrees of confidence, based largely upon the degree of prosperity experienced during the last half of 1928. Manufacturing industry as a whole was operating on an average plane of about 7 per cent over 1927, but attained its greatest momentum during the last half, the peak being reached in November, when the rate of operations was 17.2 per cent above the same month in 1928.

And so American business and industry as a whole closes the book for 1928 with an unprecedented record in production and profits, and looks forward to the new year with confidence and with the expectation of a continuance of these conditions, though with the rate of operations in the aggregate probably not much above those witnessed during 1928.

Make the Coal Industry

Bituminous Executives Emphasize Need for BETTER SALESMANSHIP

HOW can the coal industry be made more profitable in 1929? Without a doubt this is the question uppermost in the minds of most bituminous coal company executives as the present coal year enters its final quarter. *Coal Age*, therefore, has asked a selected group of these men to give their views on this all-important question. The opinions expressed in response to this invitation are included in this symposium.

Fair and adequate prices is the most important point in making the mining of coal more profitable in 1929 according to these leaders. Emphasis is placed on the necessity of securing orders at prices which will leave a fair profit to the operator. Mining without orders is strongly condemned.

Consolidation of existing properties holds prospects of relief though it may not be immediate. However, the difficulties to be surmounted in accomplishing mergers is resulting in a trend toward co-operation rather than actual consolidation. Reduction in output or its better adjustment to the actual market requirements also is strongly urged in many cases to insure an adequate return on the tonnage shipped.

Equitable freight rates, control of transportation, co-operation of the railroads, education of the consumer, more efficient production and a better understanding among the individual members in the industry also are seen as guides to increased profits.

Sees Need of Education To Bring Prices Up

"Coal being one of the biggest basic industries in the United States, it is fundamental that its ailments be cured," writes Ernest H. Gilbert, president, Gilbert-Davis Coal Co. Four major factors enter into the determination of a prosperous condition:

(1) Consumers must be educated to pay a fair price according to the quality and grade of coal they use. Coal is the only basic industry lagging at present. Its purchasing power is greatly handicapped, it has no banking credit, many of its communities are in distress, starvation wages prevail in some sections and safety may sometimes be neglected to meet competitive conditions.

It is certain that good times cannot prevail in this country until these uneconomic conditions are corrected. Sales realization should be increased 50c. per ton, whereupon the conditions outlined above would be restored to normal by the additional \$250,000,000 of annual income. One big answer to every problem affecting

the coal industry is to be found in the mechanization of mines, mechanical handling of coal in retail yards and the increased use of automatic coal-burning equipment. In addition, merchandising of coal is being accomplished along modern lines, but a stable, equitable freight rate structure is badly needed.

(2) The Interstate Commerce Commission should compel railroads to enforce demurrage rules and embargoes on coal loaded, as upon other commodities.

(3) Operators must cease loading coal not actually sold. Action by the Commission and the railroads is recommended to stop the practice of loading unsold coal. Furthermore, to avoid overproduction, mines should be placed on a five-day week schedule or, failing in this, the overproduction should be divided pro-rata among all the mines, thereby keeping production and consumption on an even basis.

(4) Coal mergers by states or districts may offer a remedy and they are slowly progressing. Accomplishment will require the removal of the actual merging from the hands of the operators, giving it to some nation-

ally known personage who has the confidence of the country.

In conclusion, Mr. Gilbert states that "the industry needs no legislation; England and Canada have tried legislative measures without success, even to the extent of subsidizing the coal industry. What the coal industry of our country needs is the co-operation of Washington and the consuming public. Otherwise, conditions similar to those prevailing in England will prevail in this country just as sure as grass grows green and water flows."

Elimination of Marginal Mines Proposed

"Everyone inside and outside the coal industry realizes that it could be made more profitable by the consolidation of many of the competing units, the closing down of high-cost and marginal mines and the incidental advantages in sales and operation that would be derived from extensive regrouping," states K. U. Meguire, president, Harlan Coal Co. Striking instances of increased profits through consolidation have marked other in-

More Profitable in 1929?

dustries, but the coal industry seems to have abandoned consolidation and turned to co-operation. Whether these attempts at co-operation will result in actual improvement is hard to say, but they seem worth making.

In Kentucky, according to Mr. Meguire, there is no talk of consolidation and the proponents of two or three extensive projects apparently have abandoned the field. Possibly this may be attributed to the unfavorable reaction of the security market toward coal bonds. Economic law, however, is continually weeding out high-cost and marginal mines which would be closed down under any status of consolidation. Cost-reduction efforts continue unremittingly, but without any early fear of wage-cutting. The weeding-out process, plus closer voluntary association on the part of operators of efficient properties seems to be the principal hope for 1929.

Better Price for Coal Is Required

The remedy for loss of profits in coal mining is easy to find, according to Charles E. Bockus, president, Clinchfield Coal Corporation. "There is only one answer," he states, and that is: "get a better price for coal." This may be accomplished in two ways.

"(1) Do not mine any coal that has not been sold, except, of course, the relatively small amount that must move in advance of sales for bunkers. With the existing facilities on railroads, both as regards cars and transportation, there should not be a ton mined that has not a definite and bona-fide demand for it by some dealer or consumer before it enters the railroad car. That would end unbilled cars and distress spot sales. Yes, it would be hard to balance small sizes with the large; but it could be done. Stop placing faith in the hope

that what is lost on the peanuts will be made up on the bananas.

"(2) Figure cost of production as you would your income tax return and make no sales at less than that figure, plus a margin of profit that would make some return on your capital.

"(3) Well, never mind. If the first two are lived up to the millenium will have arrived."

Mergers and Restriction Of Output Suggested

Two suggestions for increasing profits in 1929 are offered by C. F. Spencer, president, Pittsburg & Midway Coal Mining Co. Mr. Spencer states that "one is the consolidation of operation of mines and sales of coal, which is now well under way. From the expressions of some of our Congressmen and Senators, I am inclined to think the laws prohibiting the merging of property and interests are going to be so modified that this will be lawful.

"The second remedy would be restriction of the number of mines to the reasonable requirements of the market. This could be done by controlling the transportation, either by rail or water."

Profits Foremost in Mind Of Coal Industry

"This subject ['How can the coal industry be made more profitable in 1929?'] has been foremost in the minds of all the coal industry," writes C. F. Richardson, president, West Kentucky Coal Co., "and it has been of so much importance to the welfare of the nation that both political parties embodied it in their platforms." In his opinion the operators of mines

should reduce production to fit the demand and insist on a price that would yield an adequate return.

"Coal operators," states Mr. Richardson, "should have spine enough to tell their sales agents what price they are willing to sell their product for, rather than accept orders that have been taken by sales agents at a price less than the cost of production." Furthermore, "the same rule should apply to coal operators who maintain their own selling agencies. In addition to this, good, straightforward business ethics should be adhered to in selling the production of any mine."

Continuing, Mr. Richardson condemns the practice of getting long datings for payment for shipments and shipping a better grade of coal than the one which has been ordered. Refunds and commissions should be discontinued, especially refunds made on illegitimate claims by the purchaser. No deviation should be made from minimum prices as determined by circulars, and circulars should contain a clause stating that all sales are subject to previous sales and that prices are subject to change without notice, thus allowing the sales agency to increase prices if the demand justifies it. Shipping coal on consignment should be discontinued and large tonnages should not be held on mine tracks other than resultant sizes for which there is no demand, and even these should be limited to a reasonable quantity.

Sell Coal Only on Order

"Briefly, there are a few outstanding things which must happen before any progress can be made in this direction" [a more profitable coal industry in 1929], states F. W. Braggins, president, Lorain Coal & Dock Co.

"(1) The elimination of no-bills at the mines. Stop shipping coal to central billing stations unless an order is at hand for each car. In other words, do not mine any coal unless orders are available for billing.

"(2) Each operator mining and shipping coal should refuse to accept an order for any grade which does not represent a profit.

"(3) Officials of the coal company should have it thoroughly understood with their sales department or organization that it is not permitted to accept orders that are not profitable.

"(4) Inasmuch as there is a great overproduction of coal, some con-

Merchandising Brains and Ability



THE uneconomic methods which make for chaos in the bituminous industry must be eliminated. Merchandising brains and ability can do it. Application of such brains and ability entails some sacrifice of so-called individualism, but it is the only way out. I believe that the hour has struck when no sane man will permit a desire to "go it alone" to blind him to the need of co-operative effort to transfer this industry from the red to the black.

The trade-practice movement is the route to profits. Once this industry formulates and acts in accordance with a sound code of business ethics and trade practices, the present prevalent practice of selling for less than cost will be ended.

We can successfully attack the disease only through the utmost degree of co-operation. We have resolved and let us now execute through co-operation with the National Coal Association and the local associations in our respective districts. I am most encouraged by the recent action of several of these associations in following the lead of the National by way of naming committees which are vigorously wrestling with the subject.

I am inclined to believe, from reports received from many mining fields, that bituminous operators are finally headed, through the trade-practice plan, in the direction of a permanent basis of economic management. Ours must be a sellers' market, not temporary and not due either to transportation difficulties or to labor troubles, but permanent and because of the adoption of sound methods.

E. C. MAHAN,
President National Coal Association.

structive means of curtailment must take place and, in the writer's opinion, this can best be accomplished by a commission appointed by the federal government in the interest of conservation of our coal resources."

Coal Combinations Urged To Bring Prosperity

In answer to the question, "How can the coal industry be made more profitable in 1929?" C. W. Taylor, vice-president and manager, W. C. Duncan Coal Co., states: "My individual hope for the future prosperity of the coal business is in combinations as far as our present laws permit and in consolidations of properties, thereby eliminating unprofitable mines and overhead expense. This, in a few words, is my solution of the question."

Consolidation Holds Key To Success

Management, quality, preparation and coal well and properly sold are, in order, the essential factors to be considered in increasing profits in 1929, writes Herbert H. Taylor, president, Franklin County Coal Corporation. "Naturally," he states, "in analyzing our industry there are innumerable angles. Proximity to markets, freight rates, location, whether or not a field is unionized, all have their very important bearings." The industry is involved as a whole, however, and "consolidation and co-operative marketing" would more nearly answer the question of how to increase profits than anything else.

Co-operation Is the Road To Profits

"How can the coal industry be made more profitable in 1929?" writes Harry N. Taylor, president, United States Distributing Corporation. "In my opinion, only through co-operation between companies in all districts. Such companies as operate a group of mines should keep open only such mines as can produce the normal tonnage with full running time, thus bringing the supply and demand in closer balance. If physical consolidations are impossible, there should at least be a consolidated sales agency established in each district.

"No coal should be shipped on consignment. Unless coal is actually

(Turn to page 24)

Would Fair-Trade-Practice Code Help the Coal Industry?

By ABRAM F. MYERS

Former Chairman, Federal Trade Commission

THE question "Would the adoption of a code of fair-trade practices do the coal industry any good?" has been asked me as a natural sequel to that lately often repeated query, "What is the matter with the coal business?" Out of the mass of answers that have sought to tell what is the matter I retain above all the impression of overcapacity, too many mines, too many miners, and I have heard of such attendant problems as selling below cost or shipping coal unsold and unconsigned.

I shall not attempt to indicate what practices of the industry are unfair competition or otherwise subject to regulation because to do so would be presuming an intimate knowledge of the coal business that I do not possess, and might come dangerously near assuming an important function of a trade practice conference, which is to define unfair trade practices within an industry.

Obviously something is wrong when, as the latest income tax totals, which are for 1925, tell us, the bituminous industry suffered a net loss of \$22,363,497, not including a tax of four and one-half millions. But is the solution of these difficulties to be found in a code of trade ethics? Whatever the answer it must come from the industry itself. I, as an outsider, can do little more than point out what other industries have done and what are the general possibilities.

Assuming that unfair trade practices exist, I may suggest that the first essential in the adoption of a code is a general willingness to brush aside distrust and illwill, a readiness to join in agreements that may entail some immediate individual sacrifice but which will in the long run react for



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ABRAM F. MYERS, who resigned last month as chairman of the Federal Trade Commission to become president and general counsel of the Allied States Association of Motion Picture Exhibitors, attained his position through a series of promotions within the government service. As special assistant to the Attorney General he had charge of proceedings under the Sherman law in a number of important cases. After becoming senior attorney of the anti-trust division, Department of Justice, he was appointed Federal Trade Commissioner in 1926 and early last month succeeded to the chairmanship by rotation of office.

Mr. Myers has been particularly active in building up the trade-practice conference system, which is becoming a strong factor in the promotion of better business and is being considered as an aid to the bituminous coal industry. He was born in Fairfield, Iowa, in 1889. After taking special courses in English and economics he was graduated from the Georgetown Law School in 1912 and was admitted to the District of Columbia Bar.

the good of all the trade. Confidence and co-operation are the foundations of any set of business standards. Without these qualities a code of ethics is mere copy-book stuff.

A lack of confidence was graphically illustrated in a trade-practice conference of the motion picture industry which I conducted more than

a year ago. The producer and distributor units were finely organized and co-operated to a tee. They knew each other and they knew what they all stood for, even though it was a long way from being what the retail or exhibitor element wanted. The exhibitor group itself was not a unit. The delegates were strangers to themselves, were from widely scattered parts of the country, and it took most of the time of the conference to get these men organized so that they had confidence in themselves as well as in the other groups.

WHILE establishment of a code of ethics for the coal industry does not presuppose a trade-practice conference under auspices of the Federal Trade Commission, still the purpose is one and the same in substance, namely, to establish self-regulation. To me self-regulation is a relative term. It is voluntary conformity to standards of fair dealing and the law, but does not mean that an industry may regulate its practices wholly in its own interest and without regard to the rights of the public.

I cannot emphasize too strongly the importance of the public interest in any set of business standards. The ills of the coal industry do not apply merely to the operators themselves but rather are they a serious detriment to the economic health of the entire people. So potent a factor is this great industry in the economic, family and industrial life of the country that its proper conduct is a matter of the gravest public concern.

Therefore the industry cannot escape entirely the watchful eye of the government, and this is as it should be as long as governmental activities

are held within the bounds of regulation only. Incidentally it is obvious that those who cry loudest against government in business do so with mental reservation, since to take all government out of business would mean to repeal all incorporation laws and to withdraw tariff protection and numerous other privileges purely governmental in character.

THROUGH proper application of self-government the coal industry can escape possible prosecution at the hands of the government. If the trade is beset with practices that are unfair competition or otherwise not in the public interest, then its leaders can, with the co-operation of the government, definitely outlaw these unjust acts and adopt standards of business that will enable the operators to carry on by themselves with the assurance that they will be free from governmental interference as long as they make such interference unnecessary.

Should the coal industry decide to hold a trade-practice conference with the Federal Trade Commission it would find a means of opposing not only those practices that are patent violations of law but it could declare itself also as being against practices which, while they may not involve violations of the law, are uneconomic and unethical.

A trade-practice conference is authorized by the Commission on application of a substantial part of an industry, usually made through its trade association. The industry is thereby enabled to write its own code of ethical and economic practice, subject to approval or rejection by the Commission in the public interest. Resolutions aimed at practices illegal *per se* are placed in Group I, and the Commission undertakes to enforce compliance therewith by proceeding against all violators, whether they have subscribed thereto or not, under Section 5 of the Federal Trade Commission Act.

RESOLUTIONS placed in Group II are aimed at practices which have not heretofore been held unlawful by the Commission or the courts. The secret violation of such a resolution by one who has openly subscribed thereto, and has led his competitors to believe that he will observe the same, will result in a proceeding by the Commission on the ground that such secret violation is in and of itself an unfair method of competition.

What of a code of fair practices for the coal industry, or of any industry, written by the overwhelming majority thereof, with the Federal Trade Commission as arbiter?

The language of the statute is not like a crystal, fixed and unchangeable; it is applicable and has been applied to many practices not specifically in the minds of the lawmakers when the act was passed. The question is simply one as to the extent to which the customs and needs of the preponderant part of an industry may be taken into account by the Commission and the courts in deciding what are and what are not unfair methods of competition.

On the question whether the experiment is worth making let us consider the possibilities of the procedure as indicated by the more than forty successful trade-practice conferences already held. In the beginning the conferences were largely confined to

outlawing practices admittedly unlawful.

It is not to be inferred, however, that these conferences had no constructive value. They had the effect greatly to elevate the standard of ethics in the industries involved, to protect honest manufacturers and dealers against the unfair competition of their unscrupulous rivals, and to restore and increase public confidence in such industries. Certainly no one can question the benefits to all concerned from the wholesale elimination of such pernicious practices as short weights and measures, false advertising and misbranding.

In the past year the conferences have been even more constructive from the standpoint of the industries affected. Resolutions have been adopted providing for the publication of prices realized in actual transactions, condemning price discrimination in the language of the Clayton Act, Section 2; declaring against the payment or allowance to buyers of commissions, bonuses, rebates or allowances of any kind; against the rendering of unusual services or the assumption of unusual charges without charging the customer therefor; against discrimination in price resulting from the allowance of quantity discounts on split shipments; against selling goods below cost; and against the dumping of considerable quantities of goods in territories outside of the subscriber's particular markets and selling such goods at prices below those prevailing in his own territory.

WASTE is to be eliminated and the public protected by the establishment of standards of grade and quality. And the extremes of overproduction and underproduction are to be avoided, and stability of employment promoted, by encouraging the dissemination and intelligent use of the essential facts of industry. At the outset I mentioned excess capacity as being one of the evils apparent in the coal business. Whether this uneconomic development and the trade-practice problems associated with it can be worked out and solved through the trade-practice conference procedure is a matter to be decided by the industry itself.

I am not trying to "sell" a trade-practice conference to the coal operators, because they may be nowhere near ready for it, but, for the good of the trade and in the interest of the public, I would suggest that its possibilities be fully investigated.

Coming!

Coal operators who are trying to keep abreast of the latest developments in the mechanical cleaning of their product find western Pennsylvania a strong magnet these days.

In that section new installations of wet and dry processes and reconstruction of older plants to meet present consumer requirements are signaling the keen interest forward-looking producers are taking in the closer sizing and preparation of coal.

No development in this field has attracted more popular attention than the activities of the Pittsburgh Coal Co., with its new wet units at Champion, Banning and Warden, added to the dry plant erected some time ago at Library.

The complete story of these plants and the whole preparation program of the Pittsburgh Coal Co. will be told for the first time in the March issue of Coal Age.

Feature articles in that issue will cover every important phase of the program, including cleaning, sizing, mixing, chemical control and selling. . . . Complete . . . accurate . . . authoritative.

And Now Mechanical Preparation Sweeps the Decks

By H. D. SMITH

*Assistant to President,
Pemberton Coal & Coke Co.,
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H. D. SMITH

DURING the past year interest in the preparation of all coals, anthracite and bituminous alike, has steadily increased, induced by several causes—the highly competitive market, the prospect of its continuance, the development of mechanical loading in which impurities can be excluded, if at all, only with difficulty and the increase in output which has made imperative some sort of change in present cleaning plants and tipples. If the plants must be rebuilt it is well to rebuild them right.

Lump coal, of course, is still cleaned as ever with the aid of the picking table and hand labor. At most plants coal of egg size is being cleaned in this same manner. A few Menzies hydro-separators have been installed, however, for cleaning coal of egg size, and good results have been attained. It should be recalled also that for years jigs and tubs have been used for this purpose.

Many new plants have been erected to clean stove, nut and pea sizes, some using wet and some dry processes. Mechanical cleaning has been necessary with these sizes, for to clean them by hand would be commercially an impossibility. In some cases these sizes are cleaned in one unit and screened after cleaning, and in others it is found advisable to screen the sizes first.

At most bituminous-coal plants so much of the mine-run is below 2½ in. in diameter that the cleaning of these sizes is of major importance. Furthermore, the coal must be cleaned mechanically, if at all, because the

picking of it by hand labor would be prohibitively expensive.

New wet-washing and dry-cleaning methods have been introduced for the cleaning of these sizes and each has its advocates, but in the final analyses the best to be used is the one particularly suited to the kind of coal to be washed, the nature of the impurities and refuse in the raw coal, the final distribution of the fuel and the cost of the cleaning process.

Among the wet washers in general use today are jigs, both of the basket and overflow types, hydro-separators, the launder washer, tubs and cones, wet concentrating tables, hydrotators and various types of thickeners and classifiers. In reference to the first device, the Pittsburgh Coal Washer Co. manufactures two types of jig, the basket and the horizontal-plunger type.

The first is used to remove slate and pyrite from egg, stove, pea and slack coal, the four sizes being washed separately or together. No prescreening is necessary. The jig has a capacity up to 75 tons per hour and

requires 10 hp. for each unit. No auxiliary pump is required, as the jig handles its own water.

The jig box, or basket, is equipped with a secondary bottom fitted with valves which on the downward stroke open and allow just enough water to enter the jig box underneath the screen plate for that particular stroke. On the upward movement these valves close, thereby providing a still body of water in the jig box for the settling, or stratification, of the material. Thus back suction and the consequent loss of good coal is simply and efficiently prevented.

Instead of the eccentrics ordinarily used to produce the reciprocating motion, special rocker arms are provided that give to the jig basket an upward movement only one-half as rapid as the downward. Consequently, twice as much time is given for stratification as with the ordinary eccentric motion. At the bituminous mines of the United States there are installations of this type of jig with a total yearly washing capacity of approximately 7,500,000 tons.

THE horizontal-plunger type of Pittsburgh jig is used for the removal of slate and pyrite from nut, pea and slack sizes either mixed or separate. No prescreening is necessary. It has a capacity up to 40 tons per hour and is simple in construction and efficient in operation. It has two compartments, the pulsation of the water being produced by a plunger driven by standard adjustable eccentrics through eccentric rods operating horizontally. The first compartment

has a slate bed and the second a feldspar bed.

Each jig requires 5 hp. or less. A centrifugal pump is used to lift water from an adjacent tank to the chambers under the screen plates of each compartment. The water pumped underneath the screens has an upward motion and thus counteracts the back-suction action produced by the operation of the plunger.

The primary washing is done in the first compartment, the second being used essentially for rewash purposes. Of installations of this type there are at United States bituminous coal mines enough equipment to wash yearly about 2,000,000 tons.

THERE are many other types of jigs, among which may be mentioned the Stewart, Shannon, Elmore, Wilmot and Link-Belt. They all operate in a manner somewhat similar to that of the two types above mentioned and do satisfactory work.

The Simon-Carves washer, which is built by the Link-Belt Co. for certain conditions, has a principle similar to that of the Baum jig, as it uses air for pulsating the bed, thus producing stratification and eliminating back suction. This washer has been introduced into the United States quite recently.

Hydro-separators have been used at bituminous mines primarily for the washing of egg, stove, nut and pea sizes. Several installations have been made during the past year for the washing of egg coal and many for the treatment of egg to pea sizes. This type of separator is simple in operation, having a box into which the coal is fed in a continuous stream. It falls into water which is being pumped through a screen plate in the bottom with a steady upward rising velocity adjustable for the size of coal and refuse being treated, the clean coal floating off with the water and the refuse sinking into the boot of a sealed elevator which takes the refuse away.

These machines treat from 25 to 40 tons per hour, depending on the size of the machine and the size and type of coal treated. Roberts & Schaefer Co. report that about 21 separate installations have been erected up to the present. These are cleaning 2,500,000 tons yearly. Most of the installations are of recent construction and are located at bituminous-coal mines, though they also are used for cleaning anthracite.

The launder, or Rhéolaveur washer, uses either sealed or free dis-

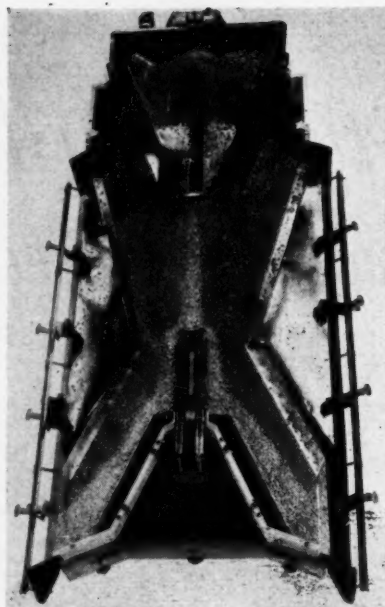


Fig. 1—Separating Deck Showing Concentration of Impurities

charge boxes for the removal of refuse. This system cleans an unclassified feed and can handle sizes from 4 in. down. According to A. France, the inventor of the system, about 80,000,000 tons of coal is being treated annually throughout the world by this method of washing. In the United States 5,500,000 tons of anthracite and 5,500,000 tons of bituminous coal can be treated by this method annually with the equipment provided.

The tub washer, known as the Robinson-Ramsey cone, has been used extensively in the Pocahontas field and in the coal fields of Alabama. It can take an unclassified feed, either the whole range from 4 in. to zero or any part of that range. This washer has the form of an inverted cone and has stirring arms that keep the bed moving so that the bone and slate can settle.

A centrifugal action suspends the clean coal so that it can be taken off the top. An upward current of water from the bustle of the cone hinders the clean coal from falling but permits of the settling of the refuse, which is withdrawn from the bottom of the cone through a seal consisting of two gates, only one of which is opened at a time. This equipment is manufactured by the Jeffrey Manufacturing Co.

The Chance cone process with its flotation of the coal in a mixture of sand and water was invented in 1915, the first commercial plant being built in 1921. In this process a cylindrical-conical container holds a fluid mass of high density, the lower part of the

fluid being agitated by a rising column of water and the distribution of this water being aided by the slow revolving movement of an agitator through the fluid mass which consists of water and sand.

THE clean coal is discharged in the overflow of the cone and the mixture is de-sanded by the clear water overlying the fluid mass in the container, by screening and by the use of clear water on the de-sanding screens. The refuse is removed from the base of the cone through a water-seal maintained by interlocked slide valves. This process can wash any size mined down to coal approximating in size the sand used in the fluid mass.

In all 28 plants have been installed, including 50 cones for the cleaning of anthracite with a shipping capacity of more than 12,000,000 gross tons per year. One bituminous-coal plant has been installed at the tippie of the East Broad Top R.R. & Coal Co., Mount Union, Pa. The two cones of this plant have a shipping capacity of 4,500 tons in eight hours of $4\frac{1}{2}$ - to $\frac{3}{8}$ -in. coal. The $\frac{3}{8}$ -in. to zero coal is screened out and without treatment is joined with any part of the washed coal.

For the washing of the very fine sizes any of the previously mentioned processes can be provided with hydro-tators and wet concentrating tables or with thickeners or classifiers for the recovery of sludge.

Sometimes where the coal has to be used for purposes where excessive moisture is objectionable it has been found necessary to add to wet washers auxiliary apparatus for the purpose of drying the fine sizes of coal. Centrifugal driers have been developed that will dry coal running from 1 to $\frac{1}{16}$ in. Where sludge or slimes have to be dried, filters in some cases have been used. In other instances coal has been dried by heat.

THE three outstanding dry processes are the American "Y" and " $\frac{1}{2}$ Y" as built by the American Coal Cleaning Corporation, the Arms table of the Roberts & Schaefer Co., and the Peale-Davis table of the Pennsylvania Mining Machinery Co. The first is illustrated in Fig. 1.

The American Coal Cleaning Corporation's tables are cleaning coal from $3\frac{1}{2}$ in. to zero, usually treating on separate tables the sizes $3\frac{1}{2}$ to 2 in., 2 to 1 in., 1 to $\frac{1}{2}$ in., $\frac{1}{2}$ to $\frac{3}{8}$ in. and $\frac{3}{8}$ in. to zero or combining the two lower sizes and treating $\frac{1}{2}$ in. to zero

on one table. The degree of presizing depends entirely on the character of the coal and refuse and on the extent to which it is desired that the coal be cleaned.

In some cases it has been found possible to decrease the number of sizes separately treated, thus making an important saving in the cost of plant equipment and lowering the operating cost. By improvements in the methods of collecting dust the system used eight years ago when the plants were first installed has been greatly simplified. The American Coal Cleaning Corporation reports that the equipment installed is treating 15,000,000 tons of coal annually.

The Arms table also requires that the coal be prescreened. The sizes usually treated on separate tables are $3\frac{1}{2}$ to 2 in., 2 to 1 in., 1 to $\frac{1}{2}$ in., $\frac{1}{2}$ to $\frac{1}{8}$ in. and $\frac{1}{8}$ in. to zero. In this case also coal from $\frac{1}{2}$ in. to zero sometimes is treated on a single table. The degree of screening adopted depends on the kind of coal and refuse being treated.

MANY improvements in design and in ability to clean coal have been made in recent years. The dust-collecting systems have been improved. These changes have resulted in economies in power consumption and in other operating efficiencies. Roberts & Schaefer Co. report 18 plants installed with an annual capacity for shipment of about 5,500,000 tons, without considering plants now under construction.

The Peale-Davis table is a dry-cleaning device which is differentiated from all others on the market by the fact that it treats all sizes of coal from 6 in. down to dust on a single table. No prescreening is needed. This should lower installation costs and eliminate the breakage incident to screening. In the plants installed to date mechanical dust-collecting systems have been found unnecessary; for a simple dust-collecting device a dust chamber of increasing area is provided. This allows the velocity of the air coming from the table to drop to such a low point that most of the dust falls into a dust chamber for collection.

In the Peale-Davis system the refuse may be cleaned on a re-treatment table which like the primary table, will handle all material from 6 in. down. The accompanying line drawings show a table-deck plan, side and end elevation, illustrate the riffing, the zoning of the decks and the sub-areas within the zones of varying air perviousness. They also exhibit the manner of handling the materials during separation so that the settled impurities are ejected through the refuse discharge boxes along the side of the table as quickly as they can be settled.

IT WILL also be noted how, through an air control of the boxes, are regulated the thickness and quantity of refuse allowed to come out of each refuse box, as also of the stratum of clean coal which flows forward in

the natural movement of the bed. The Pennsylvania Mining Machinery Co. reports that 1,900,000 tons of coal is now being treated per year on these tables and that plants are now under construction for treating 2,000,000 additional tons yearly.

Thus the dry-cleaning plants now built and under contract have a potential capacity of 24,500,000 tons of coal yearly. Quite a number of installations have been made that embrace both the wet- and dry-cleaning systems, most of which treat the larger sizes from 4 to 1 or $\frac{1}{2}$ in. by wet methods and $\frac{1}{2}$ in. to zero by air.

In determining which of the processes outlined should be chosen for any particular coal a study should be made into its washability, tests should be run with float-and-sink determinations and an analysis made of all the several products from the float-and-sink tests, which data will show the time characteristics of the coal and its impurities. After this a study should be made as to the costs of the processes and also into that important factor, the use to which the coal is to be applied. A fuel for metallurgical use may call for a different process of cleaning from one that is to be burned for the raising of steam, and a plant to produce domestic fuel may require the installation of plans different from either of the two.

Coal cleaning and preparation have made great advances and without question the coal buyer is getting a better prepared and a cleaner product than ever before.

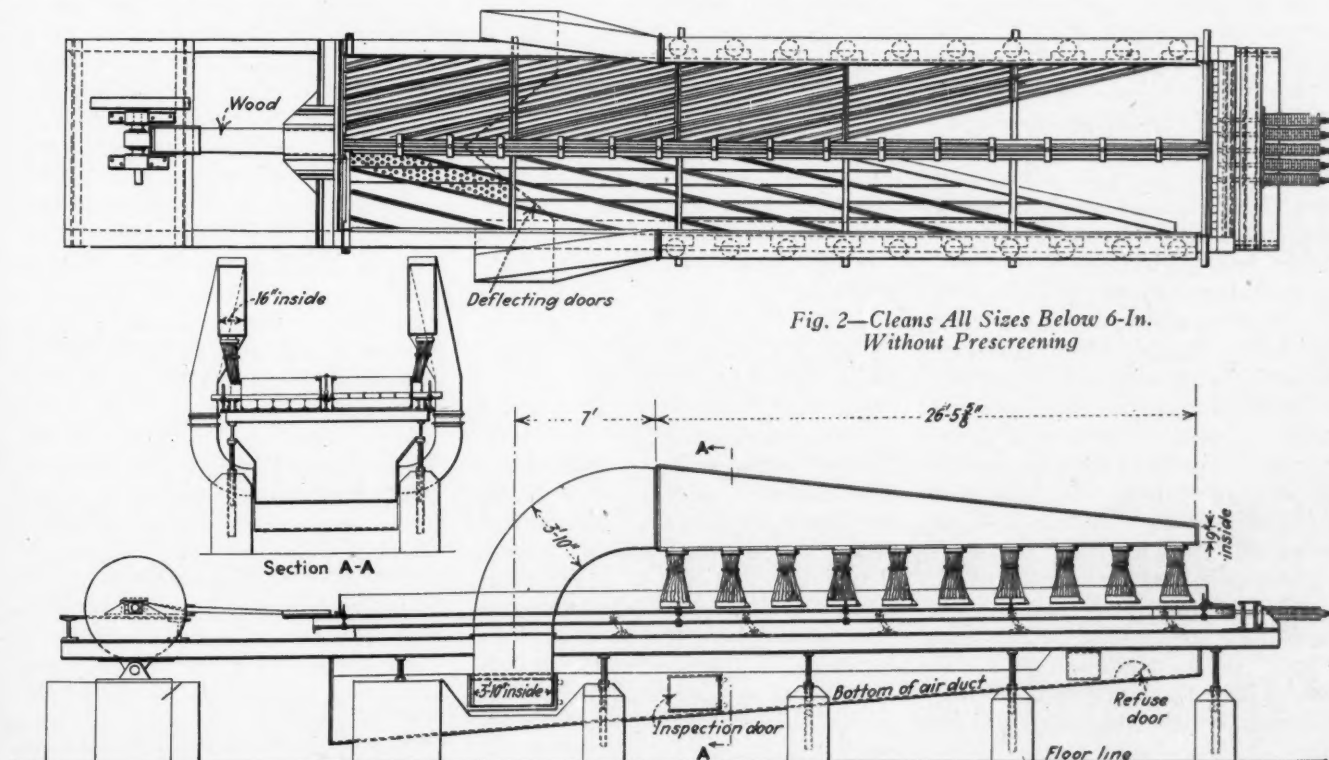


Fig. 2—Cleans All Sizes Below 6-In. Without Prescreening

Mechanization Is Lifting Burden From the Shoveler

By L. E. YOUNG

*Vice-President in Charge of Operations
Pittsburgh Coal Co.*



L. E. YOUNG

ON Jan. 1, 1863, President Abraham Lincoln ordered and declared that all persons held as slaves in the United States should be free, and thereupon over three million persons entered upon a new life—a life of freedom. This was one way of releasing human beings from drudgery.

Since the beginning of coal mining it has been the custom for men to lift or shovel coal into cars or containers to be transported along the roadways of the mine. For centuries the leaders of the industry have endeavored to reduce this and other forms of drudgery and to improve working conditions and standards of living of the coal miner. From time to time various remedies have been proposed and considerable progress has been made, particularly in the last 35 years. In the field of accident prevention and mine safety there has been concerted effort, and as a result the hazards incident to coal mining are being reduced.

Recently, in addressing a gathering of jobless English miners, George Bernard Shaw, critic of present-day civilization and leading British Socialist, is reported to have said that a civilization that was not crazy would not permit men to go into coal mines to risk their lives. He said he hoped to see the day when there would be no coal used anywhere. "I regard a nation as bordering on lunacy which allows men, and which used to allow women, to go underground to dig coal. I hope the time will come when the mines will be shut up," said Mr. Shaw.

We may smile at such suggestions coming from men who are not acquainted with problems of industry and with the progress being made to improve working conditions in coal mining. Undoubtedly the day is far off when Mr. Shaw's advice on this matter will be followed. In the meantime it is our homely job to "dig coal." But there seems to be a worldwide opinion that coal mining is not as progressive as a number of other industries.

THERE probably will not appear a Lincoln to emancipate mining labor from drudgery by decree, and all the preachments of a George Bernard Shaw will avail little if they offer nothing constructive to replace or reduce the labor of men underground. It is much better that with changing conditions we take advantage of all that science and technology offer and lighten the burden of the hundreds of thousands of men who shovel coal in mines. Shoveling coal manually into cars in mines is the last great task prevailing generally that

may be classed as drudgery. It is the outstanding relic of the customs and traditions of the eighteenth century.

It is an indication of the trend of affairs when the new wage agreement made in several states refer to mechanical loading devices and fix wage rates and conditions for the use of such equipment. In Illinois a commission was appointed to determine important matters which could not be disposed of promptly in negotiating a statewide contract.

With the assurance of the co-operation of labor it is practical for coal operators to go forward; in some instances they are using experimental units under new conditions, in other mines and districts where equipment has not been tried previously they are trying to adapt proven equipment, and in still other fields they are taking the step from the experimental stage to partial or complete mechanization.

However, the general depression in the coal industry has done much to retard progress. In spite of this situation there has been considerable improvement over 1927. In attempting to measure progress in mechanization we ask certain questions:

- (1) Have the old types of machines been improved and are they measuring up to requirements?
- (2) Have new machines been developed either to reduce costs of operation or to meet difficult conditions not overcome by older types of equipment?
- (3) Have operators succeeded in improving operating practice and management?
- (4) Have the mechanical devices

and practices contributed to improve the conditions of the worker as to safety, elimination of drudgery and opportunities to improve his daily and annual earnings?

(5) Has the field of mechanical loading been extended as to (a) total number of units in operation, (b) more complete mechanization of mines previously partly mechanized, (c) installation of units in additional mines, and (d) tonnage loaded nationally by mechanical devices?

ANSWERING these questions in the order listed, it may be stated that almost without exception considerable improvement has been made in the equipment during 1928. It would be out of place in a general statement of this character to list specifically the improvements that have been made by the large number of American manufacturers supplying mechanical equipment to the coal industry. There are almost fifty firms building devices of various kinds, including loading machines, entry-driving equipment, conveyors, scrapers and pit-car loaders, and their alertness and ingenuity in applying modern methods of design and manufacture to coal-mining conditions is commendable.

During the year 1928 several new types of loading machines have been brought out; in some instances these machines have passed the experimental stage and in others their suitability for the task and general ruggedness remains to be demonstrated in the customary manner. One of the most striking developments of the year is in connection with pit-car loaders. Whereas a year ago there were four companies building this type of equipment there are now ten and the number of units reported in use has increased from less than 100 in 1927 to more than 1,000 in December, 1928. This indicates how promptly the American manufacturer of mining equipment seizes the opportunity to develop a market when equipment of a certain type is needed.

Substantial progress has been made in the development of heavier machines of the loader type and the year 1929 undoubtedly will see the more general use of some of the large machines. Interesting experimental work has been carried on in the use of different sizes and weights of duckbills for shaking conveyors, and the results of this pioneering investigation will soon be available to the industry.

AMERICAN engineers and manufacturers may well be proud of the progress that has been made in recent years in the design and the use of effort-saving devices in all phases of industrial life, and a large part of our national prosperity has been attributed properly to the increasing use of machinery. The problem of the mechanization of coal mines is being attacked vigorously and commendable progress is being made. During 1927 and 1928 the rate of growth of the movement in some districts was reduced because wage negotiations were in progress, but after this period of uncertainty was passed a more definite policy could be formulated.

One of the difficult problems has been the loading of coal that has been shot but which has not been loosened completely. Several loaders have been designed to meet this situation and the results thus far attained in the use of the loaders indicate that real progress is being made. Considerable advance also has been made in face preparation.

The record of 91 ft. in one entry in eight hours reported to have been made in a bituminous mine indicates progress in the field of entry-driving equipment and renews hopes for equipment specially adapted to this important phase of the problem of concentrated mining.

TO THE question, "Have operators succeeded in improving operating practice and management?" there must be an affirmative answer. Without attempting to call the roll of the pioneers in the mechanical loading of coal, it is inspiring to note the convincing manner in which a number of Pennsylvania, Colorado, Wyoming and Alabama operators have progressed in the use of conveyors and scrapers, and how, in spite of thin seams and other difficult conditions, several operators in Missouri, Oklahoma and Arkansas have forged ahead. There has been considerable improvement in the average daily tonnage from machines from Utah, Montana and Wyoming in the West to Pennsylvania and West Virginia in the East.

Special problems have arisen as to mining methods and percentage of extraction, and in general there has been marked improvement along these lines. The use of mechanical devices is being adapted to fixed physical con-

ditions, and layout and practices are being modified to permit better coordination among the various steps in the cycle of face preparation, loading, transportation, inspection, maintenance and handling of supplies. Exchange of ideas has contributed largely to the steady improvement in practice—face preparation developed in Illinois and Indiana is contributing to the lowering of costs in Pennsylvania; the more efficient handling of the duckbill and the shaking conveyor in the east is due largely to the pioneering in Wyoming. Moreover, reorganization of the mining staff is becoming general as the new machinery and new methods are being introduced.

Careful inquiry among the several hundred mines using mechanical devices for loading has developed the fact that there has been a remarkable reduction in the number of lost-time accidents in the mechanical-loading sections as compared with the hand-loading sections of the same mine. Undoubtedly the more careful supervision at the working face contributes largely to this splendid result.

IT IS the consensus of opinion that when a mining community once knows by experience the benefits resulting from mechanization it will not wish to return to old methods. In large part this change of opinion is due to the fact that when mines are mechanized the loader and the cutter do not carry the burdens that existed when delays of all sorts occurred to prevent them from performing a full day's work. It may be difficult to sell the full eight-hours to the veteran loader who has known the "miner's freedom," but eventually he will real-

ize that effort-saving machinery will lighten his labor and make the full eight-hour day less exhausting than the old plan of irregular work.

The annual earnings of men have improved when there has been whole-hearted co-operation in the introduction of machinery, and this fact is becoming more widely known among the rank and file and its true significance appreciated.

National official statistics for 1927 and 1928 covering the number of mines using mechanical loading devices, the number of units in service, and the tonnage loaded are not available but estimates based upon data procured from manufacturers indicate that there are more mines using such equipment and more units in service. Assuming 200 working days per year there is installed as of Dec. 1, 1928, equipment capable of loading at least 35,000,000 tons of bituminous coal. In 1926 a total of 11,000,000 tons had been loaded by all types of devices, including the pit-car loader and the face conveyor. Prior to 1926 the tonnage had increased at about 50 per cent per year. If this rate were applied for 1927, 1928 and 1929 the tonnages would be as follows: 1927, 16,500,000; 1928, 24,750,000; 1929, 37,125,000. Under conditions existing in 1928 it is not probable that there was produced by mechanical devices a total of 24,750,000 tons. However, during the year much new equipment was installed and the capacity at the end of the year had reached the figures stated above.

Not only are there more mines producing more than half their coal mechanically but there are several new mines which have been planned for mechanical loading only. The experience of these operators will be very instructive as indicating (a) the capital required to develop and equip a mine to be operated by the new methods, (b) the time required to bring to production this type of mine as compared with the hand-loading type, and (c) the operating and fixed charges when a property is not burdened with the cost of maintaining roads, aircourses and workings opened for hand loading and kept open at considerable expense after concentrated mining has reduced greatly the area of underground workings required to produce the tonnage mechanically.

THE increased use of pit-car loaders and face conveyors calls attention again to certain fundamental points. While the use of the hand

shovel is continued when such equipment is installed, there is a great reduction in the lifting to be done by the shoveler. In the transition from completely manual shoveling to power-operated shovels (or their equivalent) such effort-saving devices as pit car loaders and face conveyors serve a splendid purpose as they provide employment for men who may not be qualified to work at the face on loading machines.

An additional important advantage to be gained in the use of such equipment is that it lends itself to the cleaning of coal at the face. It has been found in certain mines in Illinois that when pit-car loaders were installed on a day-rate basis it was possible, with the co-operation of the men, to produce coal lower in ash than was loaded previously by the shoveler on a tonnage basis. The intensive study of these problems by the wide-awake mine foreman and bosses as well as the mechanical staff of the mines has accomplished results and the experiences of those who have installed pit-car loaders deserve the serious consideration of operators investigating the advantages of various types of mechanical devices.

Among the major problems of economic significance in coal mining is that of the intensive use of plant and equipment. On the average the tonnage produced daily from each working face is too small. In order to convey to underground officials the fact that the mine exists in order that there may be working places it may be desirable to divide the total capital invested in lands, plant and equipment by the number of working places; for example, if the capital invested is \$1,000,000 and there are 400 working places, there is an investment of \$2,500 per working place. It is well to make each foreman understand that he, personally, is responsible for production from a designated number of working places and to realize the working capital for

which he is responsible. He should see the importance of concentration, and that tonnage from every place every day is necessary for rapid rate of extraction.

IN THE last few years Eugene McAuliffe and other leaders in the modernization movement have suggested multiple shifts. Progress is being made in developing a continuous cycle of operations at the face but the coal industry is still decades behind the iron and steel industry in dealing with this problem of fundamental economic importance. Mines must be drained and ventilated, working places, aircourses and roadways must be timbered and maintained. In gaseous mines all working places must be examined as prescribed by law. With all these facts every representative of capital and labor connected with the industry is thoroughly familiar.

In the modernization of mines large amounts of capital are required and one of the factors requiring careful consideration is the obsolescence of equipment. The installation of expensive machines is not justified unless they can be charged off in a short time; this is the price of progress and the industry must pay it. The proper way to pay this price is to give the machine work to do. Those who proclaim loudly that coal-mine management is archaic and antiquated and then do all they can to prevent cutting of coal at night and block the double-shifting of certain operations are, to put it mildly, inconsistent or not desirous of facing economic facts. In order to maintain high wage levels in coal mining it is essential that unit costs of timbering, ventilation, pumping, depreciation, taxes and interest be reduced. The most logical way to do this is by increasing the tonnage during every one of the 24 hours in which these charges are running. The traditions of coal mining in certain districts are a serious menace to progress. Clear thinking on this subject is timely.

In order that the program of mechanization may go forward the education of both young and older men is highly important. In Great Britain there is an organized movement to transfer surplus miners to other industries and in the United States the same process is going on but is not organized to the extent it is in Great Britain. It is reported that the young men in Britain are being directed into other industries inasmuch as they can

(Turn to page 18)

On Top

Mechanization underground has intensified the necessity for greater mechanization in the top works—closer and more scientific sizing and cleaning of the product of the loading machines and underground conveyors. Preparation problems and processes will have an important place in the 1929 editorial program of *Coal Age*. Next month and in the months following there will be special articles featuring outstanding installations and developments in both wet and dry cleaning.

Anthracite Producers Awake to Importance Of Aggressive Merchandising

By ALAN C. DODSON

*Chairman, Committee on Merchandising
Anthracite Operators' Conference*



ALAN C. DODSON

MERCHANDISING in the modern sense of the term is an altogether new activity as applied to anthracite. For a century there was no need for merchandising effort of any kind. Hard coal sold on its merits to a buying public eager to have it. Perhaps far-sighted executives might have looked into the future—now the present—and anticipated the need for more aggressive methods. It may be doubted, however, if the executives of any industry would have overexerted themselves when there was no apparent occasion to do so—when all the goods they could manufacture were finding a ready market. This is not an apology for the industry; it is a statement of obvious facts. It is only under the urge of need that either men or institutions put forth exceptional effort. The anthracite companies are now facing as severe competition from substitutes as any other industry in the country. They have a far stronger urge toward merchandising effort, and under the impetus of these changed conditions anthracite is exerting itself in many directions.

Foremost among its accomplishments is the establishment of Anthracite Coal Service. In the past hard coal was put on the cars at mines, shipped to thousands of retailers over a large territory, and what happened to the product after it reached the dealers' hands was something that the producers knew very little about and for which they took an equally limited amount of responsibility. All this is now changed; the producer is following his product to the firebox. Anthracite Service is the instrumentality through which this is being accomplished.

Beginning as a small engineering organization to deal with the large consumers, the Service has now through dealers extended its influence to tens of thousands of small consumers. It has done this by the education of the dealer in at least the elements of combustion engineering. Hundreds of retailers have been educated in the "schools" conducted by Service engineers. These dealers are not only able to give the consumer expert advice; they are better merchants with a much higher conception of their duties and responsibilities. When it is considered that this Service was improvised, its personnel built up and its policies developed almost over night, it may be fairly characterized as a remarkable accomplishment in industry.

The most interesting development of the Coal Service has been that practically all of the thousands of complaints which have been investigated in the cellar of the ultimate consumer have shown that the trouble has been due to faulty heating equipment or faulty firing methods.

The operators do not argue that no poor coal has ever been shipped from the anthracite field. They do argue that its percentage has been tremendously exaggerated by its enemies and ill-wishers and by the lack of knowledge of how to install and tend house heaters.

THAT the retailers themselves have given the finest sort of co-operation to this effort is something for which their customers as well as the producers are duly grateful. The consumer feels that someone has an interest in his welfare and that the coal man is not a public enemy—one whose activity is principally manifested in sending out poor coal followed by outrageous bills—but a man who is ready and willing to serve.

The joint activities represented by the Anthracite Operators' Conference had grown to a point where organization was imperatively necessary. This brought about the formation of two principal committees, one on production and one on merchandising. The latter maintains the producers' relations with retailers, supervises research, studies market conditions and deals with all problems arising in connection with the distribution of the product after it leaves the mines. The members of this committee give a great amount of time and thought to policies and their execution. They are constantly on the lookout for means and methods to improve our markets and our merchandising practices.

While quality has been maintained for years by the anthracite producing companies, there is no doubt that competition has forced even greater effort toward the reduction of im-

purities. The improvement of the jig, the invention of the Chance classifier and Rhéolaveur in the last few years have all permitted the anthracite companies to reduce the percentage of slate in their output.

COAL, slate and bone are so closely related as to make it very difficult scientifically to define the three. There are certain slates and bones which are beneficial in maintaining the qualification that anthracite has over its competitors, i.e., to bring the fire to a red heat, to bank it and to again bring the fire to red heat without adding much, if any, additional fuel. There are, on the other hand, slates and bones which apparently contain pyrites which are detrimental. At the moment machinery to differentiate between good slate and bone and bad slate and bad bone has not been perfected. In consequence, the refuse piles at the mines today contain entirely too much pure coal which was put there in an effort to eliminate what look like impurities. Anthracite domestic sizes are sold on looks rather than quality. Very often pure anthracite will be discolored or dull looking and be rejected, while shiny pieces of high-ash bone are accepted as coal.

There is no doubt that the industry is shipping today as high grade fuel as it can possibly ship with the equipment that has been invented for cleaning it. "Certified anthracite" means what it says.

If not generally considered a factor in merchandising, it is certainly important in meeting competition that the cost of anthracite should be reduced as far as possible, for the obvious reason that cost reduction must precede any reduction in price to the consumer. The efforts of the industry, therefore, are almost daily directed toward economies. This applies not merely to mining and breaker practice; it is also being extended into the field of taxation, rates and degradation.

Whether anthracite wages can and should be reduced is an open question; but the industry is firmly convinced that with a labor cost of at least \$4.50 out of an average selling price of something less than \$6.25 the labor cost must be reduced, production per man must be increased, there must be a higher degree of co-operation and there must be eliminated strike periods, limitation of supply, and the insistence upon the employment of useless labor. In general, what the industry is working for is

the substitution of wholehearted co-operation and a fair day's work for a fair day's pay in the place of indifference and resistance to the installation of methods aiming for economy.

Cost and price reduction will not, in our belief, be brought about through any one item. Certain freight rates require adjustment, taxation is intolerably heavy, even outside of the anthracite tonnage tax, which we are making an effort to have repealed at the next session of the Pennsylvania Legislature. Degradation is another item in cost both for the producer and the dealer. This is being attacked at all points from the loading of the car to delivery into the consumer's bin. Improvements in unloading at tidewater have been marked and all along the line is manifested a disposition to put forth the utmost effort to eliminate waste with the purpose ultimately of passing along these savings to the consumer in the form of reduced prices.

In the direction of sales effort all of the producing companies of any importance are exerting themselves to an unprecedented degree. They are employing the time-tried methods of augmented sales forces, advertising, and service to the consumer. Some 45,000,000 tons of production is represented in a joint advertising campaign that is reaching at least ten million consumers weekly through the newspapers and other mediums. In addition to this, companies are conducting their own campaigns involving expenditure of hundreds of thousands of dollars. Considering that four or five years ago nothing was being done in this direction, expenditure at the rate of probably \$2,000,000 a year in advertising does not make a bad showing.

THE practical mechanical research work that the industry is now sponsoring is an important factor in its merchandising effort. The objective of this research is greater convenience in the burning of anthracite as represented by improved heating appliances, control of heat and means for ash handling. The intent is to make the burning of hard coal as nearly automatic and free from trouble and annoyance as is possible. Given automatic control and de-ashing devices, we believe that nine out of ten people will be convinced that anthracite is the safest, most economical and dependable fuel for household heating. No effort is being spared to demonstrate this fact to the householder.

In all of these efforts we are inviting the co-operation of the distributors, and I am glad to say that we are getting in most communities all the response that we could ask. The anthracite dealer, like ourselves, is a novice in merchandising effort. We do not expect to make John Wanamakers out of him over night any more than we expect to become Henry Fords in an equally short space of time. We do know that we are on the right track and that the industry possesses the initiative and the means to overcome all of its difficulties.

Of course we have competition—so have all other industries—but with this competition recognized and neither underrated nor overrated we have no doubt of our ability to meet it, not only to maintain present markets for anthracite but to extend them among an ever-increasing number of consumers.

Mechanization Is Lifting Burden From Shoveler

(Continued from page 16)

adapt themselves to the work of these industries more readily than older men. Undoubtedly this is true, but unless extreme care is taken the whole process of mechanization both in Britain and in America is in danger of being checked. If the coal industry permits the best men to leave and does not recruit among the young men there will be simply a "survival of the unfit" and the industry will suffer the fate of the diplotocus. The older men must be trained to new tasks as well as the young men. The coal industry in the United States must see to it that its man power is kept up by training men of all ages.

The method and program for training men has received attention at a number of mines and deserves careful consideration in 1929. The expense of organized training courses to fit men for mechanized mining will be offset by a reduction in cost of supervision, of personal injuries and of maintenance of equipment.

Encouraged by the progress of 1928, the industry will carry on the mechanization program with new vigor. Undoubtedly among the objectives for 1929 will be even better co-operation among operators, the more intensive use of plant and equipment, the training of men and the more complete emancipation of the shoveler.

Coal-Mine Explosions Inflate Death Rate Despite Lower Output

By SCOTT TURNER

Director, U. S. Bureau of Mines



SCOTT TURNER

THE outstanding feature of the coal-mining industry in the United States in 1928, from the standpoint of accident prevention, was a reduction of about twenty-eight million tons in the year's output of coal without a proportionate decrease in the number of deaths from accidents in the mines. The death rate based upon production will, in fact, show an increase, and it is possible that the actual number of fatalities will show no diminution.

Judging from information available two weeks before the year closed, the accident record of the preceding year, 1927, as far as the total number of fatalities is concerned, was practically repeated in 1928, notwithstanding the greatly reduced quantity of coal mined. The apparent death rate was 3.88 per million tons of coal produced, as compared with 3.73 for the preceding year. Production was in the neighborhood of 570,000,000 tons, or 5 per cent under the previous year's output of 598,000,000 tons. The unfortunate accident experience of the industry prevents as favorable a review of the year's activities as I presented a year ago in these columns.

If further evidence were needed to prove that all bituminous coal mines should be thoroughly rock-dusted to prevent or restrict explosions of gas or coal dust, that evidence is furnished by the accident record of the past year. Deaths caused by mine explosions were more than double the number reported for 1927. Local or minor explosions—those in which less than five lives were lost—showed no increase; but major explosions—those in which five or more men lost their lives—were excessive in number.

One gas-explosion occurred in an anthracite mine and caused the death of ten men; there were thirteen major explosions in bituminous mines with a resulting loss of 316 lives. In the previous year one major explosion in an anthracite mine killed seven men and seven major explosions in bituminous mines killed 148 men. Had it not been for explosions of gas and coal dust, the industry's death rate would have been less than that of the preceding year.

DEATHS from major explosions in bituminous coal mines are particularly regrettable because many of them might easily be prevented. They are likely to continue, however, until all operating companies become convinced that every bituminous coal mine producing coal on a commercial scale should be thoroughly rock-dusted. Unfortunately, all producing companies are not yet convinced of this necessity, and the industry, as such, must therefore continue to be identified in the public mind with great catastrophes involving heavy

loss of life, the miners' families must continue to expect such visitations of grief and deprivation, and the producer and consumer of coal must continue to pay the cost which such disasters entail.

The explosion hazard in bituminous coal mines involves two factors: The presence of gas or coal dust and the presence of sparks or flame that may ignite the gas or dust. The Bureau of Mines strongly urges the coal industry to remove both of these factors of danger, as far as it may be practicable to do so. Flame and sparks may be largely eliminated by using closed lights; by using permissible explosives exclusively in all bituminous coal mines, all shots to be fired by permissible electric battery if any men are in the mine, and by adopting and properly maintaining permissible explosion-proof motors and other mechanical equipment for all underground work requiring the use of electric current, in all cases where such equipment is available on the market. The adoption of these safeguards will go far toward removing the explosion-hazard even in a gassy and dusty mine.

Adequate ventilation to prevent dangerous accumulations of gas must be maintained. The coal dust itself, however, should be rendered harmless, as a further precautionary measure against explosions; this may be done at small cost by mixing rock dust or stone dust with the coal dust to such proportions that the coal dust can no longer explode. Recent investigations by engineers of the Bureau of Mines revealed the fact that several hundred coal mines in various states were using, or had

THE Bureau of Mines has still to learn of a coal mine using rock dust in the manner in which it must be used if it is to prove an effective safeguard against explosions of coal dust. The rock-dusting method probably will not prove effective unless the rock dust is properly applied to all parts of the mine. A single application of rock dust is only a temporary protection.

The Bureau's plea to the coal industry for the new year is for the thorough rock-dusting of all bituminous coal mines except those that are definitely wet in all parts and not merely damp. Dust explosions are a hurtful and needless stigma against the industry. The elimination of this hazard is one of the most easily paid debts which the coal industry owes to itself. The debt should be discharged.

used, rock dust. It is probable that still other mines have begun to use rock dust since these investigations were made.

ROCK dust must be applied to mine surfaces frequently enough so that there will never be any part of the mine where the mixture of rock dust and coal dust will, upon analysis, show less than 65 per cent of incombustible material. Unless this percentage of rock dust is maintained the officials and employees of the mine are likely to acquire a false sense of protection against the explosion hazard until they are suddenly made to realize that rock dust, as such, is of no value and that its value lies solely in its proper use. Specific information regarding rock dust and its use is contained in several publications issued by the Bureau of Mines. These publications will be sent to anyone upon request.

Falls of roof and coal are the most prolific although not the most spectacular cause of accidents in coal mines, not only in the United States but in all coal-producing countries. Nearly half of all fatalities and about one-third of all non-fatal lost-time injuries are found, at the close of every year, to have been caused by this class of accidents. Falls were responsible for 1,058 deaths last year, according to the best information available at this time; later returns may increase this number but it probably will still be less than the number reported for the preceding year, which was 1,149. The death rate will be practically the same for both years—1.91 per million tons for 1928 and 1.92 million tons for 1927—due to

the smaller amount of coal produced in the year just past.

Accidents from falls of roof and coal constitute one of the most baffling problems with which coal miners have to deal. Theories of prevention are quite simple and apparently sound; their observance in daily practice constitutes the difficult part of the problem, particularly when one looks upon the coal industry as a whole. Marked success by many individual companies in preventing accidents of this type often is obscured by the high accident rates of other companies, so that the prevailing death rate for the coal industry as a whole is much higher than it should be.

Using the average fatality rate for the whole industry as a basis for comparison, the statement may be made that two-thirds of the producing companies have what may perhaps be called "favorable" death rates from falls of roof and coal; that is to say, these companies have rates that are less than the rates for the whole industry. To the remaining one-third of the producing companies must be laid the responsibility for the prevailing, and more or less stationary, high average death rate for all coal mines considered as a single industrial unit. As the cost of accident insurance for the individual operator is influenced largely by the average experience of the entire industry in the United States or by the entire industry in a state or other large geographical area, it is important that one-third of the industry should give special attention to the dangers of falling roof and coal, in the hope of reducing the cost of accident insur-

ance, not only for their own mines but also for those mines whose experience as regards accidents of this type already is favorable.

ASIDE from more systematic timbering to prevent falls, the chief reliance for the prevention of accidents of this kind apparently must be upon the human elements involved. About 90 per cent of those who are injured by falls are the miners, loaders, machine men and others who work at the face; only about 10 per cent of the injuries are to haulage employees or other workers underground. Therefore, it is largely to the face workers that we must look to bring about any material reduction in the number of accidents from falls of roof and coal.

The tendency of a miner to finish loading a car before he sets a prop is perhaps a natural tendency, as his earnings for the day depend upon the amount of coal he sends out of the mine. This natural inclination, however, has perhaps caused more deaths and injuries from falling roof or coal than any other single factor. Because this tendency is a part of human nature it places an inescapable duty upon the owner and operator of the mine as well as upon their supervising employees to see that the miners do not follow their natural inclination to continue their earnings by loading coal rather than interrupt or curtail their pay by stopping long enough to make their working place safe.

THE miner cannot "sidestep" responsibility by looking to his employer for safety; nor can the mine owner escape responsibility by instructing the miner how to keep his working place safe and then leaving the observance of such instruction to the miner's discretion. A ton of coal should bear the total cost of its production, but it should be produced at a figure that does not include any item of cost on account of accidents that might be prevented. This goal has already been reached, or nearly so, by some producers. The entire industry might, with considerable profit, devote a large part of its efforts during the coming year to the prevention of falls of roof and coal, the chief cause of accidents in coal mines and the one that perhaps requires the largest amount of personal effort of the individual, whether he be the owner, operator, supervisor, miner or loader.

Underlying the whole problem of falls of roof there is per-

haps a disinclination to give personal and individual thought to this subject or for each person concerned to appreciate the extent to which he is personally responsible in the matter. A natural disinclination for mental labor and a natural unwillingness to accept responsibility for unfortunate occurrences are likely to lead to a stereotyped explanation of an accident that results in personal injury.

When such an accident occurs the best guarantee that it will not be repeated is an impartial self-examination by employee, supervisor, operator and owner, each of his own individual relationship to the unfortunate occurrence. Shifting of responsibility, if indulged in, will not prove to be a corrective measure; it will not result in the prevention of accidents. Particularly will it not prevent such accidents as falls of roof and coal, a type of accidents the prevention of which lies largely in the realm of human rather than mechanical engineering.

When it is realized that nearly half of all freight hauled by American railroads is first handled and transported within the coal mines and metal mines of the country, and that most of this tonnage starts its journey in the underground workings of coal mines, it is not surprising that mine cars and locomotives should play a conspicuous part in the coal-mining industry's accident record. In normal years haulage accidents rank next to falls of roof and coal among the major causes of deaths and injuries in the mines. Occasionally, as in 1924 and again in 1928, a larger number of deaths were caused by explosions of gas or coal dust, so that in those years haulage accidents occupied third, instead of second place.

Incomplete returns indicate that 356 men were killed by haulage accidents last year, as compared with 355 in 1927. The death rate probably will be the same or slightly above that of the preceding year—0.625 as against 0.594 per million tons. Carelessness doubtless entered largely into the occurrence of many of these accidents. In most of the accidents last year the employees were run over or they were caught between the car and rib. Most of the accidents of the former kind usually occur while the employees are coupling cars or while they are operating or riding the car or trip. Coupling cars while they are in motion, and jumping on or off moving cars, are frequently the initial cause of accidents in which the men have been run over by the cars or locomotives,

or have been caught between car and rib.

Spragging and blocking in a hasty or haphazard manner, or on a roadbed not properly maintained, explains many of the accidents in which the employees become injured by being squeezed between the car and rib. Numerous other accidents charged to haulage equipment occur while the employees are rerailing cars, and another fruitful source of accidents is inadequate clearance between track and side.

An examination of reports covering haulage accidents over many years reveals an increasing accident rate. As the mines become larger, longer hauls become necessary, more cars must be used and transportation must be speeded up, so that to some extent an increasing accident rate might appear to be a more or less normal result of such growth, just as the increasing number of motor cars in the country has brought an increasing accident rate based upon the population of the country.

Whatever the cause, however, a rising accident rate must be strenuously resisted if an alarming frequency of this class of accidents in the near future is to be avoided. Already the rate has climbed 15 per cent in the past sixteen years; it has risen from 0.33 deaths per million man-hours of exposure in the five-year period 1911-15 to 0.38 per million man-hours in the period 1922-26, the latest five-year period for which figures are available.

Statistics show that while haulage employees receive most of the injuries due to haulage accidents, an almost equal number of this class of injuries are to the miners and other workers at the face. For every five injuries to haulage workers, the miners, loaders, etc., receive four injuries and the miscellaneous employees underground receive one. Any reduction in haulage accidents, therefore, will be of significant benefit to the two principal groups of underground workers, who comprise about 85 per cent of all of the men who are

employed underground in coal mines. Such a reduction, however, is likely to prove difficult to accomplish because of the increasing scope and complexity of haulage operations necessary to keep pace with increasing tonnage.

THE coal-mining industry is the largest consumer of explosives in the United States; more than 200,000,000 lb. is consumed annually, about a million pounds every day that the mines are in operation. For every 3 tons of coal produced 1 lb. of explosives is used. It is therefore not surprising that in the handling and firing of such large quantities of explosives the yearly accident record for coal mines should include some accidents due to the use of explosives in coal-mining operations.

Approximately one hundred lives are lost in this way every year, chargeable directly to handling and blasting, in addition to which other lives are lost in gas or dust explosions that can be traced indirectly to explosives as the initial cause of the explosion of the gas or dust. In the latter case the deaths resulting from the accident usually are considered under the general subject of explosions.

Records for the year 1928 will, it is believed, show about 75 employees killed by accidents directly chargeable to explosives, a very gratifying reduction from the preceding year's record, which showed 110 deaths similarly caused. The apparent death rate for last year was 0.132 per million tons, a reduction of about 28 per cent from the rate of 0.184 for 1927.

Sixty-six per cent of all explosives used in bituminous coal mines and 25 per cent of all explosives used in anthracite mines is black blasting powder. The use of this type of explosive in bituminous coal mines is particularly inadvisable because of the likelihood of the long, slow and hot flame following the firing or blasting of the shots, igniting gas or coal dust that may be present near the point of blasting and the lack of assurance that such gas or dust, particularly gas, may not be present in any given coal mine, although the mine may never have been known to accumulate gas in explosive quantities.

The Bureau of Mines recommends that all bituminous coal mines use permissible explosives exclusively for rock work as well as blasting coal, and that these explosives be fired electrically. This recommendation is made in the interest of safety, as it is

Efficient Foremanship

What does the production foreman have to do with making the mining of coal pay a profit? Van B. Stith, superintendent, Green River Fuel Co., Mogg, Ky., who spent most of his school-boy vacations in the mines of Indiana and knows the foreman's job intimately from actual contact and experience, asks that question—and answers it—in the February issue of *Coal Age*.

believed that the use of none but permissible explosives, a type of explosives characterized by a quick, short and relatively "cool" flame, will not only reduce the number of gas or dust explosions in coal mines but will, if the explosives are fired electrically and therefore at a safe distance from the face, lessen the number of accidents from premature blasts, shortened fuse and other accidents closely identified with the use of black blasting powder.

BOTH bituminous and anthracite mines are using permissible explosives in steadily increasing quantities. Thirty-one per cent of the explosives used in anthracite mines and 28 per cent used in bituminous mines are permissibles. This proportion represents a reasonably healthy growth since permissibles were first introduced into coal mines, but the safety of mine workers requires an even more rapid substitution of permissibles for more dangerous types of explosives, and, indeed, would dictate the complete elimination of black blasting powder in bituminous coal mines.

Electricity is fast becoming—in fact, has already become—one of the foremost aids in speeding up the production of coal; it has made possible the adoption of methods and equipment that have greatly increased the output per man employed. It has at the same time brought its characteristic hazards into the mines. Chief of these hazards, at least during recent years, has been the danger of electric arcs igniting gas or coal dust and thus initiating explosions with their all too frequent death toll.

During the year just closed at least five major explosions, resulting in 242 deaths, were alleged to have been traced to an ignition of gas or coal-dust by an electric arc. There were, in addition, 88 deaths caused directly by electricity; these accidents did not involve the explosion of gas or dust. Contact with trolley wires or with machine feed wires cause most of the accidents of the latter type. The death rate for the year for accidents from electricity which did not result in gas or dust explosions was, according to present records, 0.156 per thousand tons of coal mined, as compared with 0.167 for the preceding year, a reduction of 7 per cent. Including the deaths from explosions traceable to ignition of gas or dust by an electric arc, electricity was directly or indirectly responsible for 15 per cent of all deaths from accidents in the

coal-mining industry last year. It must therefore be considered one of the major hazards of the industry and accordingly should receive a large part of the industry's thought concerning the elimination of accidents.

THE year 1928 witnessed the announcement of the results of the Third National Safety Competition, a contest conducted by the Bureau of Mines to promote safety in the mineral industry and to discover the mine or quarry having the best safety record. These annual contests are revealing some remarkable safety records and they are clearly demonstrating the fact that coal and other minerals can be produced almost without accidents and, in some cases, absolutely without them, at least without accidents serious enough to incapacitate an employee or cause him to lose any time from his work. Records covering the Fourth National Safety Competition, relating to the calendar year 1928, are now being examined, and the Bureau hopes to announce the results early in the new year.

The leading company in the 1927 contest, as far as bituminous coal mines are concerned, was the United States Coal & Coke Co., to whom the bronze trophy "Sentinels of Safety" was awarded because of the safety record of that company's No. 2 mine at Gary, W. Va. More than four hundred men were employed at this mine and the work performed by them during the year was the equivalent of 688,927 man-hours, yet only one accident occurred in which the time lost exceeded the remainder of the day of the accident. The total length of disability was 91 days, representing an accident-severity rate of 0.132 per thousand man-hours of exposure to hazard; the accident-frequency rate was 1.45 per million man-hours of exposure to hazard.

It should be stated that the accident records on which these annual safety contests are based include all fatal, permanent and temporary injuries resulting in an employee's disability beyond the day or shift on which he was injured. The uniformity which characterizes the recording of the accidents and the treatment of the records insures comparability of the accident rates of the various companies that participate in the contest. Other excellent safety records, obscured only by the achievements of the winning companies, are being revealed annually by these contests, not only for coal mines but also for metal

mines, non-metallic mineral mines, and quarries and open pits.

The Bureau of Mines will be glad to learn of any non-participating company having an accident record, covering all lost-time accidents properly weighted as to loss of time, that compares favorably with the accident records of the winners of the "Sentinels of Safety" trophies in the National Safety Competition. The accomplishments of the winning companies are, as far as the Bureau of Mines has definite information, the best safety records in the mining industry in the United States; they represent extremely close approaches to the zero, which is the aim of all progressive mining companies and which represents the complete elimination of accidents in the mining and quarrying industries.

THE Bureau of Mines collects its information on accidents, both fatal and non-fatal, by means of questionnaires sent at the end of each year to the head or operating offices of metal mining and quarrying companies. This same method should be applied to coal mines; at present the Bureau's knowledge of coal-mine accidents is derived from monthly reports sent the Bureau by state coal-mine inspectors, on fatalities alone.

The only information the Bureau has regarding accidents other than fatalities in coal mines it obtains through volunteer reports of each individual accident from a relatively small number of operators in connection with the National Safety Competition conducted by the Bureau. This article gives figures on fatalities alone; but how desirable it would be if a similar analysis could be made of non-fatal accidents, based on direct voluntary reports to the Bureau by all coal-producing companies at the end of each year!

All accident statistics are handled in the Bureau by an accident statistics section, presided over by W. W. Adams, who directs the work of ten assistants. No other federal agency collects or deals with accident statistics for the mineral industries, and no state agency collects complete statistics of non-fatal injuries. This article is made possible by the work of Mr. Adams and his assistants, and if more personnel were made available through a small increase in appropriations, I feel sure this subdivision of the Bureau could expand its work in such a way that the industry as a whole would be interested and would ultimately profit.

Why Need for Technical Training of Men In Coal Industry Is Pressing

By C. E. LAWALL

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MUCH attention has been directed in recent years to the overproduction problem in the bituminous coal industry but scant attention has been given to the underproduction of technical men to meet the increasing demand of the coal industry for mining engineers. In the past the bituminous coal industry of this country on the whole has been reluctant to employ technical skill or technically trained men. This feeling still exists among some mining men, and it emanates from the presumption formerly held among practical mining men that a college man knows next to nothing.

Only a few years ago it was quite common to hear successful mining executives complain about the worthlessness of a technical training to equip a man to undertake mining work and for these executives to ascribe their own success in part to a lack of a technical education. And even today, strange as it may seem, there are still some "old timers" in the industry who think that it makes its possessors, or "victims," impracticable and incompetent to engage successfully in mining work.

The truth of the matter is that most young mining engineers readily adapt themselves to the rapidly changing conditions in the coal industry and cope with the new problems that are constantly arising more successfully than the older men, who often find it so difficult to change from the old to the new way of doing things.

Why the bituminous coal industry of this country has been so backward in employing technical men is difficult to understand. The mining industry of Europe and the anthracite industry of this country have been

employing technical men for many years and have found it profitable to do so.

No doubt much of the reluctance of the industry to employ technical men has been due to the fact that the mining industry, probably more than any other, has always had an important place for the practical man and for many years has been dominated by him because mining is an art as well as a science and the skill and dexterity of the practical man, acquired by observation and experience, have always played an important part in the mining of coal. But for anyone to suppose in this scientific age that a technical education handicaps a young man to attain success in the coal industry betrays an amazing misunderstanding of mining schools, their methods of training and of the young men that are being graduated from them.

Most of the young men now coming from the mining schools understand from the beginning of their

college work that when they graduate they must start at the bottom. Fortunately, most of them do start there, for there is no education like that of experience, and a thorough knowledge of many of the important details of coal mining is gained only by doing them.

The coal industry has reached that period when it should offer fine opportunities to technical men. It has grown from a desultory business to a highly competitive business during the past decade and this change is bringing about a demand for men in the industry who can and do think scientifically—men who by a judicious combination of theory and practice can handle facts and learn all about a thing and then are able to make it work—the type of men who in every sense of the word are engineers.

Some of our present-day coal mining executives are technical men and they realize that the industry needs technical men now more than ever before and that the demand will grow from year to year. Technical men will not displace practical men because the industry needs both and they must work in harmony with each other if the best possible conditions in the industry are to be brought about. The industry as a whole, however, has never done anything to attract young engineers into it nor has it as yet shown any interest as to where its future supply of trained mining engineers will be obtained. These conditions and lack of interest on the part of the coal industry are beginning to produce the inevitable result.

Young men entering technical schools now are not enrolling in mining engineering courses, so that

the coal-mining schools are not graduating enough men to supply the normal need of the coal industry for engineers. This is not because many young men do not like mining engineering work but because in selecting a career a young man compares one field of engineering with the others and when he sees scouts from nearly all the great industrial corporations appear each spring at the technical schools looking for promising students and rarely or ever sees an executive of a coal-mining company among them he takes it for granted that the coal industry is not interested in technical men and enrolls in some other course.

The problem of the shortage of young mining engineers for the coal industry has been recognized by some far-seeing executives and has caused them to encourage young men around their mining communities to go to mining schools. Each year they offer opportunities to several young men to work in the mines during their vacation periods and give them a start when they finish school. Allowing for certain exceptions, one does not take much of a chance in employing a young mining engineer because he has

been under careful observation and high-pressure training for four years and probably has a more trustworthy guarantee of intelligence than most of the young men that ordinarily apply for positions in and around the mines.

It seems, therefore, that if the coal industry is interested in obtaining young men who will be qualified by training and experience to enter and later on become competent to fill important administrative and technical positions steps should be taken by the industry to attract young engineers to it. One of the best ways to give expression to this interest is for mining companies to have a definite arrangement for employing a certain number of young mining engineers from time to time and start training them where the technical school left off, by means of a well thought out plan which will give the young engineers an opportunity to learn something about the economic as well as the technical side of the industry and also by placing them in jobs where they will broaden their relation to other men in the industry and in the community and thus start them on the right road to become engineers.

How Can We Make the Coal Industry More Profitable in 1929?

(Continued from page 8)

sold it should not be produced. Coal operators should set aside old prejudices and jealousies and adapt themselves to changing conditions. Last, but not least, arrange with the powers that be for better coal-burning weather than existed in 1928."

No Practical Way Exists To Increase Profits

No feasible or practical way exists, under present laws and conditions, of making 1929 more profitable for the coal industry is the opinion of R. D. Patterson, president, Weyanoke Coal & Coke Co., though two things might happen.

"A large number of operating properties might close down if they were not properly located geographically, if their coal did not have some special properties, or if their cost of production was not competitive." This would leave the remaining properties in better condition, though three or four years probably would be required.

"There is, of course, a remote possibility that a series of mergers might properly be made. This, in my opinion, would be best, not only for the industry but the country at large. From past experience it has not been possible to do this. There are so many different coal mines, personalities and financial tie-ins that the man who could reconcile them all would be a Moses, indeed."

Profits Depend on Sales

As labor has about reached its greatest efficiency, further mechanization cannot be depended upon to cut costs materially and wage scales are fairly well stabilized for a year or two, Geo. Heaps, Jr., president, Iowa Coal Operators' Association, believes that "the problem of more profits in 1929 is up to the sales departments. More profits will be had if just a little common horse sense is used in getting a fair and reasonable price for every grade of coal."

"It seems to me," he states, "that it

has been definitely determined that selling coal below the cost of production doesn't sell a ton more than would be sold at a decent, respectable profit."

On Limiting Production, Consider Markets

Market requirements are considered by Charles A. Owen, president, Imperial Coal Corporation, who states that "Our bituminous coal markets require about 70 per cent of the capacity of the mines. The industry will be more profitable when each individual producer sells no coal below cost of production, including distribution expense, based on operating at 70 per cent capacity and the prevailing wage scale in his district, limiting production at all times to orders on hand."

Increase Sales Realization To Boost Profits

Increased sales realization is the most important point in a program of profits, according to H. W. Shewalter, president, Continental Coal Co., who states that the "operating cost is practically at a minimum; therefore the sales organization should strengthen their realizations. Distress coal should be eliminated regardless of argument; railroads should more keenly realize and appreciate their relationship to the coal industry; capital should emphasize with the management of operations the importance and necessity of getting a return on their investment. In other words, it is not a one-man job, and all the different interests should play a determined part to improve the present situation."

Better Mining and Selling Hold Out Hope

More careful operating and better merchandising are seen as the chief hopes for profits in 1929 by John C. Cosgrove, chairman of the board, Cosgrove-Meehan Coal Corporation. Many things will enter into better merchandising, "such as placing the coal where it is best suited, better presentation by better equipped sales representatives, better sales co-operation with the producers producing a similar product.

"I see no one large outstanding thing," Mr. Cosgrove continues, "that can be done in 1929 which will greatly correct the troubles of the

(Turn to page 44)

Does Export Association Offer Important Outlet for American Coal?

By E. V. GENT



ERNEST V. GENT has been manager of the Zinc Export Association, Inc., 61 Broadway, New York City, since its inception, Dec. 1, 1925. Mr. Gent's former connections, covering the period 1907-1924, were with the chemical industry, during which time he was principally concerned with the development of export markets, necessitating extensive foreign travel. Since the Webb-Pomerene law was enacted, in 1918, Mr. Gent has had close contact with export association activities and as a result of this practical experience is a staunch advocate of the Webb-Pomerene association plan.

THE coal industry is engaged in a herculean effort to find a solution for its many problems. Harassed by the common complaint of overproduction and increased competition in distribution, relief is being sought in many directions. There is much talk of mergers and an attempt has even been made to enlist government aid, but the remedy has not yet been discovered. It is hardly likely that a panacea will be found for the ills of the industry and therefore consideration should be given to remedies which promise partial relief.

Big business in the United States is showing keener interest in foreign markets than ever before and it is evident that some major industries are rapidly developing efficient export organizations with the determination to hold trade already won abroad and to further increase foreign business. The coal industry cannot afford to lag in the procession and should immediately study ways to widen its distribution in foreign markets.

American coal is already known abroad, as the following government statistics will show:

Year	Tons	Value
1913.....	4,102,000	\$11,437,000
1914.....	4,233,000	12,405,000
1924.....	3,969,000	19,562,000
1925.....	3,608,000	16,808,000
1926.....	19,320,000	103,616,000
1927.....	3,051,000	15,708,000
1928*.....	1,556,000	7,297,000

The war years and the post-war boom resulted in greatly increased exports, which cannot be considered as normal business and therefore are omitted. The 1926 figures show the effect of the British strike.

*To Sept. 30.

First must be realized the remarkable improvement in European industry generally, the increasing aggressiveness of foreign producers and the efficiency of the cartel system. These

highly organized trade combines permit foreign producers to concentrate the efforts of an entire industry, which, coupled with the necessity of exporting their commodities in order to live, sets up the severest competition which the American exporter must be prepared to meet.

SPECIAL legislation in the form of the Webb-Pomerene law is available to the American exporter confronted by the picture just drawn; he is placed in a privileged class which is exempt from the penalties of the Sherman law and other anti-trust legislation; he is granted the right to form with his competitors an export trade combine in which all interests within his industry may consolidate

their export activities and act in unison. The Webb-Pomerene law was enacted in April, 1918, for it was apparent even at that early date that American industry must be equipped to meet foreign competitors on equal grounds.

Sixty-two export trade associations have so far been registered under the Webb-Pomerene law, representing copper, zinc, steel, lumber, cement, locomotives, rubber and sulphur. It is extremely interesting to note that the Steel Export Association of America, formed by the United States Steel Products Co. and the Bethlehem Steel Export Corporation, is a recent addition to the list. Eventually, it is believed, this combination will fully represent the American steel industry in foreign trade. The petroleum industry is the latest group to manifest keen interest in co-operative exporting. The Standard Oil Co. through five of its subsidiaries recently formed the Standard Oil Export Corporation as a step toward participation in a general export association representing the oil industry of the United States.

THE coal industry can well afford to give this subject due consideration, especially at this time, when it is trying to find a common interest which will draw the various factions of the industry closer together. It is anticipated that some will maintain that the coal industry is "different," that the task of organizing so many interests into one group cannot successfully be accomplished.

The answer to the first objection is the list of varied industries already

operating export associations; if sardines and locomotives, copper and pearl buttons, wine shooks and steel can best be exported through a Webb-Pomerene association, why not coal? As to the difficulties of organizing the coal group, ways and means have been found to accomplish this task in the other industries mentioned, and it is difficult to imagine any problem which cannot be solved if those concerned can be induced to bring into the discussion a proper helpful spirit.

The form of organization to be adopted depends to a great extent upon conditions in the industry, the decision of the organizers and the advice of counsel. Some associations function as corporations having binding contracts with member-stockholders for whom the association acts as exclusive export selling agent. Such a corporation is financed by member-stockholders and may earn its overhead by collecting a commission on goods actually shipped or by some equitable pro rata plan among member-stockholders. The association in this instance has complete control of the export products of members, establishes selling prices, makes sales, fixes the proportion of each member's participation in orders booked, ships the merchandise, bills and collects payment from foreign buyers.

Under the alternative form of organization the association functions only in a regulatory manner, does no actual trading but permits members to continue direct selling arrangements. The association may handle the actual shipment of exports, and also the financing where desirable, or it may merely provide a means to obtain the co-operation of members in the essential phases of their export business.

IT HAS been the experience of others that the best method of organizing a Webb-Pomerene association is to draw up a preliminary plan which seeks to cover all phases of the proposed activity in considerable detail. If a small group, familiar with the foreign trade of the industry and in sympathy with the idea in principle, can be induced to undertake this work, many of the difficulties disappear. It should be borne in mind that while it may be desirable to have all export trade units within the industry as charter members of the association it is not essential and often impracticable. Therefore a start may be made with a small but representative group, which fre-

quently and in due course attracts others to seek membership.

The advantages enjoyed by Webb-Pomerene associations include the economy resulting from operating the combined export business of the industry through a central office with one administrative body and a single operating staff. This means perfect control, elimination of duplication in sales effort, closer contact with foreign consumers, direct supervision and standardization of quality, better protection against unjust claims, simplification and standardization as applied to export business.

AN ASSOCIATION brings to the industry added prestige in its dealings with foreign buyers and insures the utmost co-operation of bankers, with increased credit facilities when needed. It is an organized force equipped to protect the rights of the industry in all matters concerning foreign trade and is in an excellent position to cut costs incidental to moving the product from point of origin to foreign destination. Co-operation in foreign trade provides the means to eliminate cut-throat competition among exporters here and permits a united front in dealing with the foreign competitor.

Co-operative effort more readily provides the means by which the necessary missionary work in foreign fields can be accomplished. The highest available talent can be obtained, not only to direct the work of the association at home but in the consuming field abroad. To successfully enter some of the foreign markets and to hold the position already won in others it may be considered wise to operate in certain territory for a time even at a loss, in order to reap an ultimate harvest. In such case the introductory expense and trading loss can more easily be borne if distributed among a group than by an individual pioneer. The resources of the group insure the necessary funds to establish branch offices abroad where needed either as active selling agencies or merely as sources of trade information.

The problem of advancing credit to foreign buyers always is a difficult one, and it is a great advantage to members for the association to be in position to obtain the necessary information upon which all members may decide the matter of extending credit. Furthermore, the cost of gathering such information is materially reduced when one central organization collects and disseminates

the results to numerous member-companies.

The Webb-Pomerene association, in addition to the special functions mentioned, enjoys equal scope with the domestic trade association or institute which benefits its membership in numerous ways. It may direct its efforts toward the correction of unfair foreign tariffs and unfair foreign legislation of all kinds. It also is in an excellent position to foster desirable foreign public relations and satisfactory industrial relations directly bearing upon the export business in hand. Also in the collection and distribution of statistical information, co-operative advertising and numerous other ways it can be extremely useful. It should be borne in mind that a united front at this end means added prestige in the eyes of the foreign competitor.

QUITE pertinently the question may arise as to the advantage or disadvantage accruing to the foreign buyer through the development of the export association theory into practice. In many lines the Webb-Pomerene association has resulted in export movement which otherwise could not have been successfully accomplished because of the expense of individual effort or lack of facilities. The foreign buyer has the great advantage, in dealing with most export associations, of knowing that he is doing business with the actual producer, thus eliminating many intermediaries, saving commissions, brokerages, etc. He can safely confine his negotiations to one channel, with a material saving of time and money and with the knowledge that a thoroughly substantial organization, with ample finances back of it, is watching out for his interests to see that he gets what he wants when he wants it, with strict adherence to contractual obligations. The saving in operation cost under the association plan more often than not accrues to his benefit and certainly he is in a better position to enlist the producer's assistance in solving problems in connection with his use of the products or in catering to his special needs of quality or character of the product involved.

With this much closer contact it is obvious that good will is more quickly established between buyer and seller, which means fewer causes for misunderstanding, elimination of unwarranted complaints and claims and, in general, smoother relations and better business is enjoyed by both principals.

Britain, Busily Erecting Cleaning Plants, Finds Wets and Drys in Conflict

By R. DAWSON HALL

Engineering Editor, *Coal Age*

MUCH similarity can be traced between the coal market conditions in the United States and in Great Britain and between the interest shown in the two countries in the development of coal-cleaning consequent on those conditions. Because last year coal sold only with difficulty and in inadequate volume in both countries, the producers in both began to realize that their market depended on clean coal.

Like the United States, Great Britain has been by no means clear as to what type of cleaning equipment to install. It also has found a conflict between the "wets" and the "drys." It has gone to Belgium, it has come to the United States and taken devices new and old, and it has devised some new systems of its own which may perhaps enter our own market later. But wherever the devices for washing may come from, the outstanding factor remains that Great Britain is installing coal-cleaning devices vigorously.

Among the British devices is one described by George Raw and F. F. Ridley to the World Power Conference at its recent fuel sessions in London. It is known as the Static Dry Washer because, unlike the American dry washers, the table is so loaded with coal that the air driven into the coal bed merely opens the

mass without throwing it up, a pressure being provided suited to the depth of the bed. This table is shown at the bottom of the page. The size of coal treated by this method is the undersize from a 1½- or 2-in. screen.

THE deck surface is quite plain, there being no ruffles, guides or air-controlling devices. The coal is not separated over the face of the deck from the slate or the bone but, as in the jig or the Rhéolaveur, the particles are stratified. The coal is on top and the bone below with the rock particles forming the bottom layer. By the use of a skimmer the clean coal is removed from the top at two points in its journey and immediately at the point of its removal the bed is narrowed, so that it is again deepened. Finally the middlings are removed by another skimmer and sent back to the feed and the refuse is discharged to go to the waste heap.

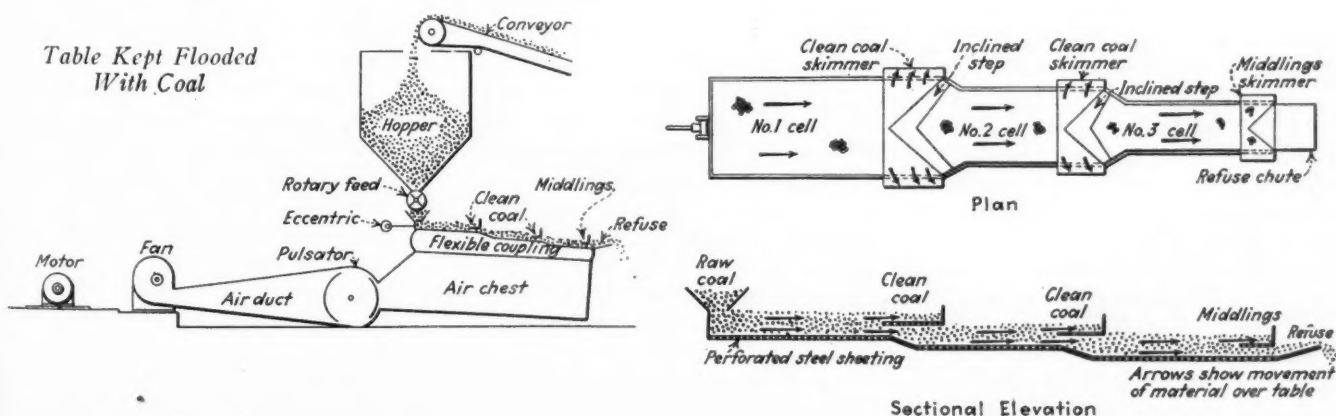
The flow of coal is by gravity, the mass being more like a liquid than a solid, being kept in a flowing condition by the action of the air and possibly by the longitudinal oscillations of the table, which latter have no propulsive character. The table is oscillated by an eccentric running at

300 to 400 r.p.m. and giving a ½-in. travel.

The air pressure is varied on a principle similar to that which produces the pulsations in an organ pipe—namely, by resonance. This variation in pressure aids stratification and also assists in eliminating breaches, or "pipes," in the bed due to the escape of excess air at any one point. The slight decrease in pressure permits the coal to flow back over the mouth of any hole thus created, stopping it before erosion of the sides of the hole can develop.

Plants have been erected by the Easington and the South Hetton Colliery companies at Durham, England. At the latter the plant has a capacity of 66 tons per hour and the cost for interest (5 per cent), depreciation (15 per cent), maintenance, attendance and electric power is 5.79c. per net ton. The power consumption is 0.76 kw.-hr. per net ton of raw coal treated, the figure including the conveying of coal to and from the colliery screening plant. The advantage of static action in the cleaning of the coal is said to be that when the coal is thus supported variations in the size of the particles are not important.

Another device is that of R. Lessing, which was described at the Second International Coal Conference, held at Pittsburgh, Pa. A



report of this process appeared in last month's *Coal Age*, p. 735. This washer is working at a gravity of 1.4, which is somewhat low for almost all American coals—far too low for some—and doubtless is none too high for most of those in Great Britain. What is wanted is a solution that will have the desired specific gravity, will be obtainable at a low enough price and will be readily recoverable from the coal. Perhaps such a solution is obtainable, at least one that will serve for American bituminous coal, if not for American anthracite. What it is has not, as yet, been suggested. The time may come, however, when some separate use may be made of middlings, and then low-gravity solutions like calcium chloride may be acceptable. Perhaps that time is approaching, especially where there is a demand for coal for metallurgical purposes. One company in America is already preparing to make two coal products out of the raw coal from the mines.

YET another new British process is that named after the inventor, A. A. Lockwood. This was described in the *Colliery Guardian* (Vol. 137, p. 1122) and to that article this description is in the main indebted. The inventor appears to lay stress on the use of the resiliency of coal, or, in other words, on its power of rebounding on striking an object. He uses that power, however, in a new way.

With the Emery picker of the Pennsylvania anthracite region and with the Pardee spiral, which has been used extensively for both classes of coal and in Europe as well as in America, the raw coal is divided into clean product and waste by the lively motion of the clean coal as compared with the sluggish movement of the ash-laden material. That liveliness doubtless is due in part to its resiliency—its ability, that is, to rebound and to lift itself clear of the chute with its retarding friction. The slate maintains contact on the picker or spiral plates, as the case may be, and cannot free itself from its rubbing action and so tends to travel at a much slower pace than the coal.

The Lockwood cleaning equipment treats without sizing all coal below 1½ in. The coal is run into bins and thence passed by a chute onto a narrow table with sides like a launder or trough. The coal is aided in moving forward by an oscillating motion and the application of a low air pressure. The inclination of the table is

varied to suit the coal to be treated. The oscillation spreads the coal and refuse over the surface.

On the top of the table three or more slats are attached on each side which run from the sides toward the center but inclined forward. They look like chevrons on a soldier's sleeve. The slats, however, only approach the center and do not reach the center line. A passageway is left between the pairs of slats down which the coal can travel unimpeded. When the raw coal strikes these slats it is directed toward the passageway.

The lighter coal in converging with the refuse to the center passage naturally leaps onto and above the more sluggish dirt—that is, stratification results. At each conveyance a horizontal skimmer, or diaphragm, is introduced to remove the cream of the coal product. The clean coal is then removed to a dry launder or trough. The heavier material that remains at each convergence passes down inclined oscillating surfaces, the angles of which with respect both to the line of transverse motion and to the horizontal may be varied to suit the different kinds of product being treated.

As the particles travel down this inclined and oscillating surface they rebound in greater or less degree, according to their relative densities, establishing thereby a clear line of demarcation between clean coal particles, shale, pyrite and other contaminating substances. The rebound may be materially increased or retarded according to the nature and position of the obstructor.

To add to the efficiency of the rebounding wall a current of air is allowed to percolate through it. Air acts as a separating medium on many dry substances but it causes fine coal to escape as dust and for this reason it has been condemned.

IN THIS process the air is not used for blowing purposes but merely as an adjunct to distinctive separation. It produces a partial classification of the fines and considerably intensifies the effect of the rebound of the propelled particles by imparting to the obstructor a flexible resistance which can be readily controlled by a mere turn of a tap.

When the air is slightly moist and the coal is inclined to agglomerate the air pressure may be increased to such an extent as to tend to eliminate the moisture and obviate the adhesive tendency of the coal. By using hot air this effect may be increased.

Moreover, by using hammers or pendulums on the side of the table its oscillation will give a tapping action that will materially add to the speedy separation of the heavy and light particles.

The fine coal thus separated is carried to a transverse belt. The refuse is screened and what falls through the meshes is passed over a chevron table like the first for the removal of any coal that may be left. Once again the heavy material is passed down over inclined and oscillating surfaces so that particles of coal may be recovered. Thus clean coal leaves each unit by four separate paths.

AN INSTALLATION has been in operation for over 18 months at the Lewis-Merthyr Collieries, Trehadfad, South Wales.

The Simon-Carves coal washers, which are manufactured in this country by the Link-Belt Co., have long been used in Great Britain. From 1903 to March, 1928, plants having an hourly capacity of 11,411 tons had been installed in Great Britain. If these washeries were estimated as running eight hours daily and 300 days a year the coal washed would aggregate 27,386,400 tons annually.

Another washer that has had an extensive application in Great Britain is the Rhéolaveur. Up to Jan. 1, 1928, eighteen of these washers had been installed with an aggregate capacity of 1,310 tons per hour. These washers treat large and small coal, some handling up to 3½ in. and some the finest of silt.

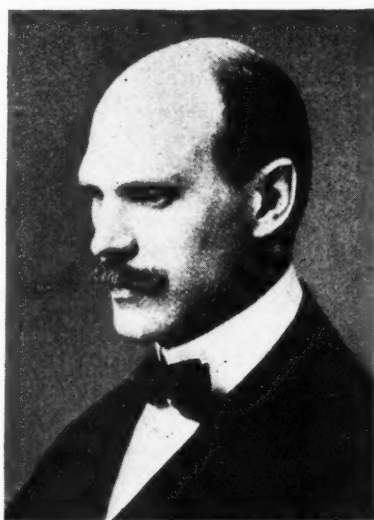
Prior to 1928 the American Coal Cleaning Corporation had six dry-cleaning plants in Great Britain with a capacity of 765 tons per hour. These were installed for an equal number of companies by the Birtley Iron Co. In 1928 eight new dry-cleaning plants were added with a capacity of 675 tons per hour, or an aggregate of 1,440 tons to date. Roberts & Schaefer also have two dry-cleaning tables at a plant in England. The Pennsylvania Mining Machinery Co. constructed a plant at Handsworth Colliery for the Nunnery Colliery Co., Sheffield, England, and construction on another for the Bidwas Colliery in South Wales will commence some time this year.

A company that has been extremely active in Great Britain has been the Anthracite Separator Co. It has installed in all fifteen spiral separator plants treating over 2,000,000 tons annually through their agents Messrs. Hugh Wood & Co. *

Why the Coal Industry Cannot Afford to Neglect Research

By SUMNER B. ELY

Secretary, Second International Bituminous Coal Conference



SUMNER B. ELY

SCIENTISTS and engineers are now beginning to realize that a piece of coal is something more than a mere piece of fossilized fuel that exists only to be burned. There are possibilities in coal hitherto undreamed of. There is developing a "newer chemistry of coal."

Through the magic of catalysis and hydrogenation coal can be made into gasoline, kerosene, paraffin, alcohol, fats, and nearly any other hydrocarbon desired. Through the distillation process, coal can be made into fuels suitable for specific purposes: Metallurgical coke, smokeless low-temperature coke, gas for domestic and other uses, oils for internal combustion engines, etc. Coal is the starting point for so many things, such as explosives, fertilizers, various oils, dyes, medicines and a great host of the finer chemical compounds, that it is quite likely in the future our coal will be treated or processed before it is used as a fuel.

Some have gone so far as to say that it is a crime to burn raw coal. This is an extravagant statement inasmuch as many of these transformations and processes, while technically possible, are not yet on a commercial basis. Scientific research is the key to the problem. The adoption of the new technique will be determined by the ability of the scientists to cheapen the processes, many of which are in the experimental stages, and in finding a profitable market for the by-products which will be obtained.

It would seem that the logical persons to carry on such research would be the coal-mine owners; but, strange to say, they have left what little has

been done so far to others. We see on every hand inroads being made in the coal industry by new engineering and scientific developments. For a number of years various improvements in fuel saving have been coming into use.

It would appear as if the real solution for the troubles in the coal-mining industry is to discover new ways of utilizing the mine output—in other words, an increased demand for coal. If research has injured the coal markets, research also can be employed to help the coal markets. The problem is to make coal a more valuable commodity, to find new uses, new outlets for it, and far-sighted men are beginning to see that scientific research is the way to find this answer.

It is necessary to cheapen and perfect experimental processes, as has been suggested, but what we really need is fundamental scientific research. Industrial research for the solution of existing commercial problems will take care of itself. The important thing for the true advancement of the coal problem is to gain

a knowledge of the laws and principles underlying the constitution and structure of coal and its behavior under various conditions.

THE National Coal Association has a research committee which held a meeting a year or more ago and it is to be hoped that the coal industry will take up the matter of fundamental research. Up to the present time, however, the small amount of fundamental research carried on in this country has been done mostly by a few universities. Abroad more has been done, particularly in Germany and England, where there are several great laboratories with large and highly trained technical staffs and where work of real scientific significance is being carried out.

The United States possesses one-half of all the known coal deposits of the world—a magnificent and precious national asset. Why let foreign countries originate methods and processes that we may be forced to use later, at great expense, in order that our own resources may be developed? Dr. Thomas S. Baker, president of the Carnegie Institute of Technology, where the Second International Conference on Bituminous Coal was held on Nov. 19 to 24, 1928, in his opening address said: "We cannot limit efforts to apply discoveries of the laboratory to practical and useful ends. This conference should have a positive value in that it should point out to the coal-mine owner of this country the necessity of forming a partnership with the skill and knowledge of the scientist in order that he may find new uses for coal."

Fitting Product to Consumer's Needs

How Bituminous Coal Met the Issue In 1927

By H. O. ROGERS and F. G. TRYON¹

THE rapid advance in mechanization of bituminous mines, both above and below ground, is shown in a statistical survey of preparation equipment recently completed by the Bureau of Mines.

A century of mechanical evolution separates the hand fork with which the early miner loaded out the lumps at the face and the Pittsburgh Coal Co.'s central preparation plant at Champion, Pa., with its daily capacity of 13,000 tons and its six loading tracks, each for a different size of coal. Among the important developments have been the bar screen, once in general use and still found in many districts; the revolving screen, used for sizing smaller coal, and the adoption of the run of mine basis of paying miners. The last-named development, which replaced the lump-coal payment plan in Illinois in 1897, encouraged refinement in preparation and stimulated the installation of shaker screens.

Modern screening practice may be said to date from the introduction of the flexible-support shaker from the Pennsylvania anthracite field in 1910 and of the Marcus horizontal shaking screen from England in 1912². With subsequent improvements, shaker screens have become the commonest type of preparation equipment, and the practice of screening has spread from the North and West to the South and East until at the present time all of the major producing fields are equipped to produce prepared sized coal. Many of these newer bituminous tipples compare with the most modern breakers in the anthracite region and a growing num-

ber are equipped to clean the coal mechanically as well as to size it.

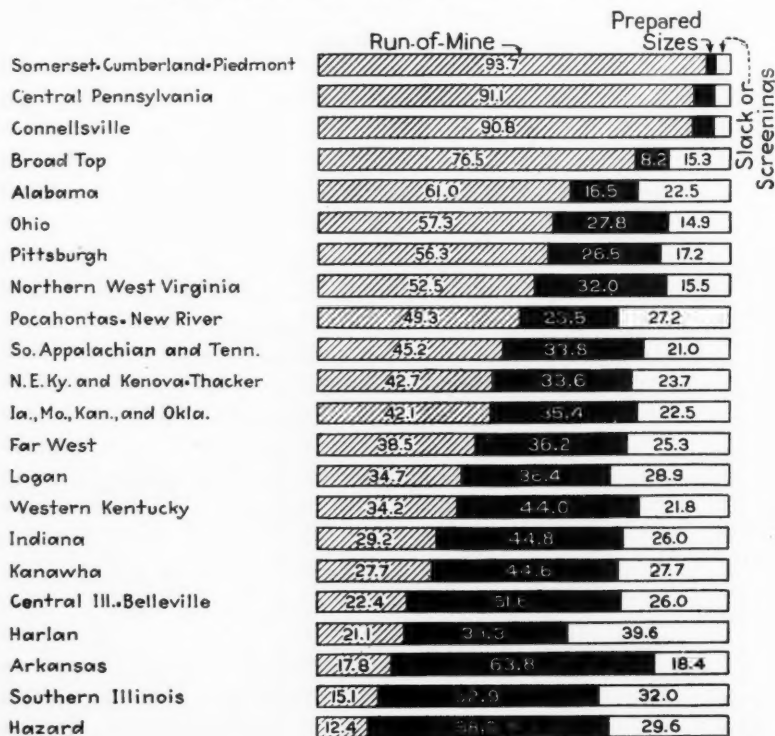
In 1927 there were 2,886 mines, accounting for nearly 80 per cent of the total shipments, that were equipped with some type of screening facilities. Of the coal shipped during that year, 50.2 per cent was run of mine, 29.3 per cent was prepared sizes, and 20.5 per cent was screenings or slack. The total shipments from the mines for which information on this subject was obtained amounted to 474,363,000 net tons, of which 238,231,000 tons was run of mine (including "modified" or "special" run of mine), 139,127,000 tons prepared sizes and 97,005,000 tons screenings or slack. As the grand total of shipments from all mines in operation during the year was 480,223,000 tons

it will be seen that the mines reported on covered 98.8 per cent of the industry. The remainder unaccounted for was 5,860,000 tons, most of which represented shipments from small mines, chiefly as run of mine.

The study did not cover the sizes of coal produced but not shipped (the mine fuel, local sales and coal charged in beehive ovens at the mines), which amounted to 37,540,000 tons in 1927. Were these items included they doubtless would tend to increase the proportion of run of mine and screenings over the average for the shipments alone.

The accompanying table summarizes the information collected for each state and for the major producing fields. The table is based on replies to an inquiry on the Bureau's report

Fig. 1—Per Cent of Run of Mine, Prepared Sizes and Screenings or Slack in Shipments from 22 Bituminous Coal Areas in 1927



¹Published by permission of the Director, U. S. Bureau of Mines (not subject to copyright). The authors are indebted to R. W. Metcalf for advice and assistance.

²For a historical review of screening see E. A. Holbrook and Thomas Fraser, *Screen Sizing of Coal, Ores, and Other Minerals*, Bureau of Mines Bulletin 234, p. 7.

form sent to all operators with an annual production of 2,000 tons or more. Each operator was asked to state the amount of run of mine, prepared sizes and slack or screenings that was loaded at the mines for shipment, and in addition whether the coal was cleaned on picking tables, loading booms or railroad cars.

A FEW operators failed to reply to the question, and in such instances the 1927 edition of "The Keystone Coal Buyers' Catalog," published by the McGraw-Hill Catalog & Directory Co., was consulted to determine whether the mine was equipped with screens. If "The Keystone Coal Buyers' Catalog" showed that the mine in question used screens estimates were made on the basis of the proportions shipped from other mines operating in the same producing district with similar equipment. There remained a small tonnage from mines for which no direct information was received and which were not listed in "The Keystone Coal Buyers' Catalog." This tonnage came chiefly from small operations and for the most part was probably shipped as run of mine. As it amounted to less than 2 per cent of the total shipments of bituminous coal it might be disregarded entirely without detracting materially from the value of the study, but has been shown separately as unspecified.

The figures for screenings obviously include material of widely varying sizes, depending on local practice, type of screening equipment and market demands. Sometimes they include all coal passing the familiar 1½-in. bar screen, which a generation ago was the standard equipment over much of the Central bituminous region. Sometimes, on the other hand, they consist of material that has passed a ¾-in. or even ¼-in. screen.

These differences in the upper size limit of the material passing into the screenings are one principal cause of the wide variation in the ratio of tonnage of prepared sizes to tonnage of screenings in the different fields. For the industry as a whole in 1927 there were 1.4 tons of prepared sizes shipped to 1 ton of screenings shipped. In North Dakota, where much of the slack coal is unmarketable, the ratio was 5.1 to 1. In Arkansas it was 3.8 to 1. In much of Illinois, in west Kentucky, the Hazard field and a number of other districts it was 2 to 1. In still other districts such as the low-volatile fields of the Appalachians, the ratio was less than one, for in these areas the ship-

ments of screenings or slack exceed those of the larger sizes.

While for the country as a whole more than one-half the bituminous production is still shipped as run of mine the relative proportions of prepared sizes and run of mine vary widely in different parts of the country, depending on the local market demand. The percentage of run of mine shipped from the various

bituminous coal producing counties in 1927 is shown in Fig. 2. The counties in solid black are those in which 90 per cent or more of the shipments were run of mine, while the counties in which the run of mine forms a smaller part of the total shipments are shown in graduations of diminishing density. The bar chart (Fig. 1) brings out still more clearly the wide variations between difficult districts.

Shipments of Run of Mine, Prepared Sizes and Screenings Or Slack from Bituminous Coal Mines in 1927

State and Producing Field	Quantity Shipped (Thousands of Net Tons)				Per Cent of Total Shipments (Excluding Unspecified Tonnage)			
	Run of Mine	Pre- pared Sizes	Slack or Screen- ings	Total Re- ported	Not Speci- fied	Grand Total	Run of Mine	Pre- pared Sizes
Alabama.....	11,487	3,113	4,236	18,836	45	18,881	61.0	16.5
Arkansas.....	224	802	232	1,258	257	1,515	17.8	63.8
Colorado.....	2,087	3,424	3,015	8,526	17	8,543	24.5	40.2
Georgia.....	3	20	49	72	.....	72	4.2	27.8
Illinois.....	9,171	21,262	12,136	42,569	189	42,758	21.5	50.0
Northern Illinois ¹	240	189	125	554	.....	554	43.3	34.1
Fulton-Peoria ²	891	1,123	505	2,519	13	2,532	35.4	44.6
Danville ³	970	775	607	2,352	3	2,355	41.2	33.0
Central Illinois ⁴	2,657	6,032	3,050	11,739	105	11,844	22.6	51.4
Belleville ⁵	917	2,177	1,097	4,191	19	4,210	21.9	51.9
Murphysboro ⁶	444	255	259	958	.....	958	46.4	26.6
Southern Illinois ⁷	3,052	10,711	6,493	20,256	49	20,305	15.1	52.9
Indiana.....	4,742	7,273	4,234	16,249	505	16,754	29.2	44.8
Iowa.....	839	816	321	1,976	171	2,147	42.5	41.3
Kansas.....	1,151	884	985	3,020	8	3,028	38.1	29.3
Kentucky.....	21,365	27,380	18,045	66,990	590	67,580	32.2	40.9
Western Kentucky ⁸	6,980	8,969	4,454	20,403	275	20,678	34.2	44.0
Northeastern Kentucky ⁹	9,131	7,043	4,893	21,067	130	21,197	43.3	33.4
Hazard ¹⁰	2,822	4,020	2,050	6,929	49	6,978	12.4	58.0
Harlan ¹¹	2,822	5,259	5,288	13,369	5	13,374	21.1	39.3
Southern Appalachian ¹²	1,773	2,089	1,360	5,222	131	5,353	34.0	40.0
Maryland.....	2,331	96	150	2,577	117	2,694	90.5	3.7
Michigan.....	250	314	133	697	.....	697	35.9	45.0
Missouri.....	610	1,188	584	2,382	219	2,601	25.6	49.9
Montana.....	1,531	869	333	2,733	57	2,790	56.0	31.8
New Mexico.....	1,295	981	547	2,823	.....	2,823	45.9	34.8
North Carolina.....	49	.....	.....	49	.....	49	100.0	.....
North Dakota.....	114	876	173	1,163	50	1,213	9.8	75.3
Ohio.....	7,119	3,447	1,854	12,420	724	13,144	57.3	27.8
Northern and Eastern Ohio ¹³	5,037	2,439	1,409	8,885	557	9,442	56.7	27.5
Southern and Western Ohio ¹⁴	2,082	1,008	445	3,535	167	3,702	58.9	28.5
Oklahoma.....	1,884	869	508	3,261	437	3,698	57.8	26.6
Pennsylvania.....	90,902	14,792	10,227	115,921	278	116,199	78.4	12.8
Broad Top ¹⁵	656	70	132	858	.....	858	76.5	8.2
Central Pennsylvania ¹⁶	28,005	1,412	1,321	30,738	11	30,749	91.1	4.6
Northwestern Pennsyl- vania ¹⁷	5,441	1,340	880	7,661	9	7,670	71.0	17.5
Pittsburgh ¹⁸	14,819	6,974	4,542	26,335	258	26,593	56.3	26.5
Westmoreland ¹⁹	11,335	3,572	2,117	17,024	.....	17,024	66.6	21.0
Connellsville ²⁰	21,214	1,235	926	23,375	.....	23,375	90.8	5.3
Somerset ²¹	9,432	189	309	9,930	.....	9,930	95.0	1.9
South Dakota.....	.....	.....	.....	.....	3	3	.....	.....
Tennessee.....	2,964	1,454	850	5,268	155	5,423	56.3	27.6
Texas.....	1,196	81	11	1,288	.....	1,288	92.9	6.3
Utah.....	581	2,516	1,467	4,564	.....	4,564	12.7	55.1
Virginia.....	6,476	3,412	2,280	12,168	66	12,234	53.2	28.0
Washington.....	1,160	315	384	1,859	576	2,435	62.4	16.9
West Virginia.....	64,775	41,279	33,199	139,253	1,283	140,536	46.5	29.6
Cumberland-Piedmont ²²	1,185	58	64	1,307	32	1,339	90.7	4.4
West Virginia Pan- handle ²³	3,873	815	857	5,545	63	5,608	69.8	14.7
Northern West Virginia ²⁴	18,047	11,006	5,306	34,359	419	34,778	52.5	32.0
Kanawha ²⁵	3,597	5,792	3,589	12,978	416	13,394	27.7	44.6
Logan ²⁶	7,854	8,239	6,571	22,664	63	22,727	34.7	36.4
New River and Winding Gulf ²⁷	17,266	6,631	7,216	31,113	135	31,248	55.5	21.3
Pocahontas ²⁸	10,343	6,543	7,961	24,847	126	24,973	41.6	26.3
Kenova-Thacker ²⁹	2,610	2,195	1,635	6,440	29	6,469	40.5	34.1
Wyoming.....	3,725	1,658	1,050	6,433	2	6,435	57.9	25.8
Other States and Alaska ³⁰.....	.....	6	2	8	111	119	.....	75.0
Total United States.....	238,231	139,127	97,005	474,363	5,860	480,223	50.2	29.3

¹Includes Mercer, Bureau, La Salle, Grundy, Will, Putnam, Marshall, Livingston, Woodford and McLean counties. ²Includes Rock Island, Henry, Knox, Stark, Peoria, Fulton and Tazewell counties. ³Vermilion County only. ⁴Includes Menard, Logan, Sangamon, Macon, Edgar, Christian, Shelby, Macoupin, Montgomery and Madison counties. ⁵Includes Bond, St. Clair, Randolph, Clinton and Washington counties. ⁶Jackson County only. ⁷Includes Marion, Jefferson, Franklin, Williamson, Johnson, White, Saline, Gallatin and Perry counties. ⁸Includes Christian, Crittenden, Daviess, Hancock, Henderson, Hopkins, McLean, Muhlenberg, Ohio, Union and Webster counties. ⁹Includes Carter, Boyd, Magoffin, Martin, Morgan, Johnson, Floyd, Pike and Letcher counties. ¹⁰Includes Breathitt, Lee, Perry and Knott counties. ¹¹Includes Harlan County only. ¹²Includes Laurel, Knox, Bell, McCreary, Whitley and Clay counties. ¹³Includes Belmont, Carroll, Columbiana, Coshocton, Guernsey, Harrison, Jefferson, Portage, Stark and Tuscarawas counties. ¹⁴Includes Athens, Hoeking, Jackson, Meigs, Morgan, Muskingum, Noble, Perry, Sciota, Vinton and Washington counties. ¹⁵Includes Huntington, Bedford and Fulton counties. ¹⁶Includes Blair, Bradford, Cambria, Center, Clarion, Clearfield, Clinton, Elk, Indiana, Jefferson, McKean and Tioga counties. ¹⁷Includes Armstrong, Butler, Mercer and Lawrence counties. ¹⁸Includes Allegheny, Beaver, Greene and Washington counties. ¹⁹Includes Westmoreland County only. ²⁰Includes Fayette County only. ²¹Includes Somerset County only. ²²Includes Grant, Mineral and Tucker counties. ²³Includes Brooke, Hancock, Marshall and Ohio counties. ²⁴Includes Barbour, Braxton, Gilmer, Harrison, Lewis, Marion, Monongalia, Nicholas, Preston, Randolph, Taylor, Upshur and Webster counties. ²⁵Includes Boone, Clay, Kanawha, Lincoln, Mason and Putnam counties. ²⁶Includes Logan County only. ²⁷Includes Fayette, Greenbrier, Raleigh and Wyoming counties. ²⁸Includes McDowell and Mercer counties. ²⁹Includes Mingo and Wayne counties. ³⁰Includes the States of California, Idaho, Nevada and Oregon.

Among the factors controlling the percentage of prepared coal are the hardness and structure of the coal, its adaptability to domestic and other uses requiring prepared sizes, and the demands of the market. In areas where much of the coal is sold for household fuel the bulk of the product is screened and sized and the proportion shipped as run of mine is correspondingly low.

The field reporting the highest percentage of prepared sizes in 1927 was North Dakota; but as all of the coal produced is lignite, the state is hardly comparable with the bituminous-coal-producing fields. Ranking next in the proportion of prepared sizes was Arkansas, where 63.8 per cent was shipped as prepared sizes, 17.8 per cent as run of mine, and 18.4 per cent as slack or screenings; but Arkansas also is not strictly comparable with the bituminous producing fields, as much of the coal mined is semi-anthracite or blocky semi-bituminous and is harder than most bituminous coals.

Of the true bituminous fields, Hazard, in southeastern Kentucky, ranked first in the percentage of prepared sizes. This district produces a hard coal that stands transport and storage well and is much

prized as a domestic fuel. In 1927 58 per cent of the shipments was in the form of prepared sizes, 12.4 per cent being run of mine and 29.6 per cent screenings. Another notable example is Whitley County, in southeastern Kentucky, where the famous Jellico and Blue Gem seams are mined. Other fields shipping a large proportion of the output as prepared sizes are southern and central Illinois and the high-volatile districts of southern West Virginia.

The region shipping the highest percentage of mine-run in 1927 was the Somerset-Meyersdale and Cumberland-Piedmont field, where 93.7 per cent was shipped as run of mine and only 2.5 per cent as prepared sizes. Closely following in the proportion of run of mine shipped were the central Pennsylvania and Connellsville districts.

The low percentage of prepared sizes in these fields is partly due to the character of the coals, but chiefly to market conditions. The Connellsville coal is used almost exclusively for coke manufacture, while in the markets accessible to central Pennsylvania, Somerset and the Cumberland-Piedmont region, anthracite is readily available, and the domestic consumption of bituminous is small.

THE screening equipment installed naturally has a capacity in excess of the tonnages actually screened and sized. The mines equipped with screens of one type or another in 1927 produced four-fifths of the total output of bituminous coal. Even in areas where the demand for house coal is small, such as central Pennsylvania, Somerset and Cumberland-Piedmont, an increasing number of operators have equipped themselves with shaker screens and are in a position to ship large tonnages of prepared coal when the market requires.

In 1927 there were 7,011 bituminous coal mines of commercial size in operation, of which 2,886 mines shipping 383,667,000 tons, or 79.9 per cent of the total shipments, were equipped with screens. Of these, 1,539 mines, shipping 240,577,000 tons, were equipped with shaker screens (including a small tonnage from mines equipped with revolving and vibrating screens); 684 mines, shipping 67,482,000 tons, were equipped with gravity bar screens; 195 mines, shipping 26,925,000 tons, used a combination of both gravity and shaker screens, and 468 mines, with shipments of 48,683,000 tons, reported the use of screens but did not specify the type employed.

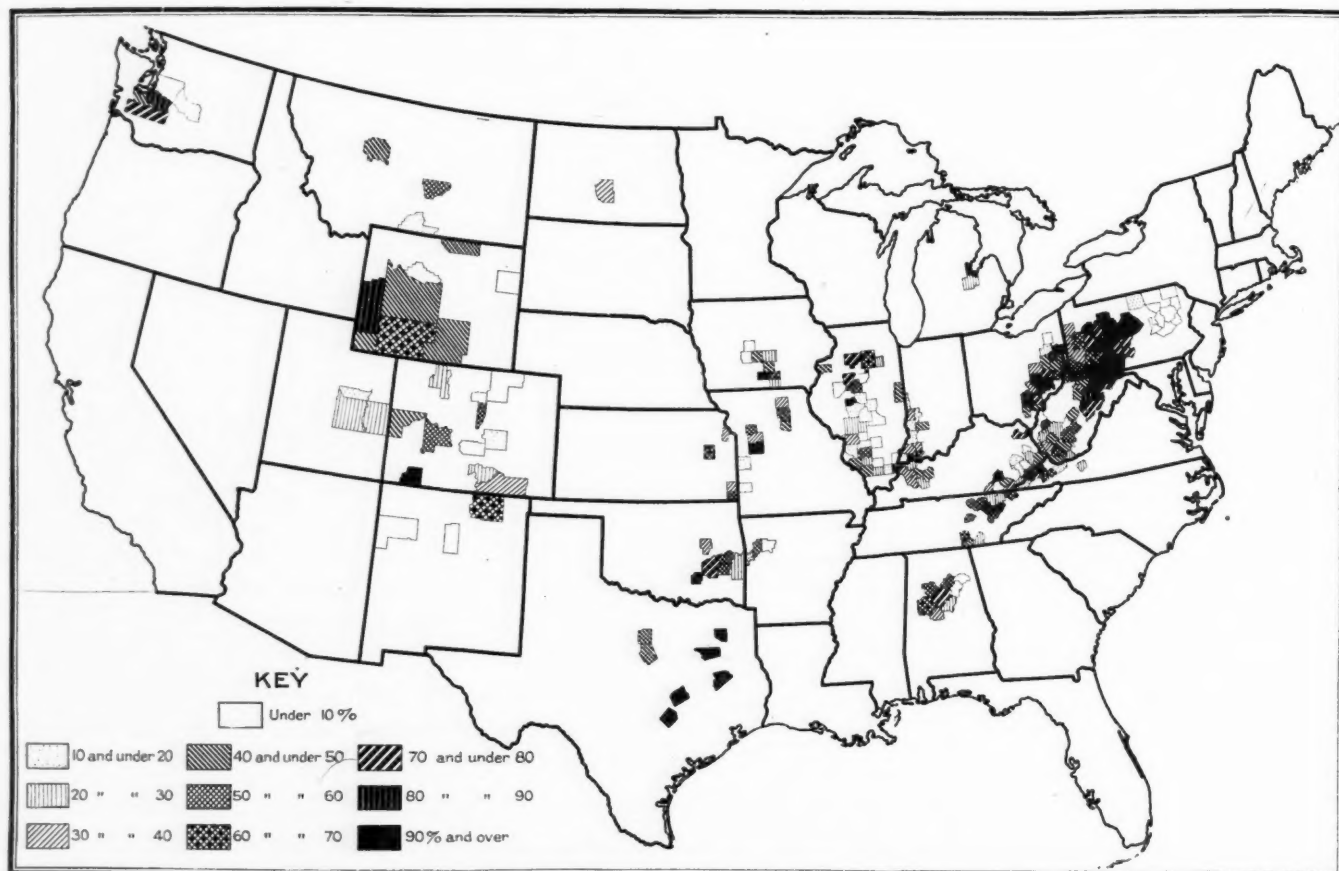


Fig. 2—Variations in Demand for Prepared Sizes, Screenings and Run of Mine in Shipments From Each County in 1927
The map covers the coal-mining counties that produce as much as 100,000 tons per year. Counties in which the demand for house fuel is relatively large show a low percentage of run of mine and appear on the map as white or very lightly shaded.

Retailer Looks at Sales Co-operation

—And Finds It Not So Good

By MILTON E. ROBINSON, JR.

President, National Retail Coal Merchants' Association

"Inside Stuff"

A FEW WEEKS AGO an editor of *Coal Age* inveigled the genially aggressive president of the National Retail Coal Merchants' Association into luncheon at Chicago for the express purpose of asking Mr. Robinson two questions:

— 1 —

What the retailer expects from the producer in the way of merchandising co-operation;

— 2 —

What the retailer ought to give the producer in the same field.

Instead of answering these questions directly Mr. Robinson forthwith dispatched a personal letter to fifty-nine prominent retailers scattered from Maine to Virginia and from the Eastern seaboard to the plains well beyond the Mississippi. Included in the list were representative merchants in both large and small communities. They were asked the same questions the editor had asked Mr. Robinson and were told that they might parade their views in the open or come to the party incognito.

Thirty-two of the fifty-nine accepted. Their replies and the deductions to be drawn therefrom form the basis of Mr. Robinson's article.

Now, go on with the story.

—THE EDITORS

* * *

IN THE first place, we were somewhat struck by the number who chose to remain *en masque*. Is it fair to draw any deduction from this? We believe so. No extraordinary memory is required to remember the day when King Operator could do no wrong, and many a Subject Retailer found his tonnage decapitated for intimating otherwise.

The crime of *lèse majesté* ought to be out of date in the coal industry,

and if it isn't this story will have served some purpose if it does nothing more than bring to light the need for frankness between the operating and distributing ends of the business. And we honestly believe that no fear need be exercised today over this phase of the question. Surely both branches of the industry are sufficiently enlightened in 1929 to welcome sincere and constructive criticism.

If every reader might see the original letters from which this symposium is drawn, he would be struck by the recurrence of the words "uniform preparation and sizing." In nearly every case the writers have been fair about it; they have contrasted the tendency toward perfection that exists today with the don't-give-a-damn policy of a few years ago, but they remember that these reforms did not come as a result of past suggestions of the retailer. They came after production curves began to fall.

The writers—perhaps justifiably—seem fearful that at some turn in the road—perhaps some temporary detour created by a peak of demand—the producer will forget his new resolutions and let down his standards, if only to increase production for the emergency. And they all realize that every time this happens, off go another bunch of disgusted consumers to the "substitutes." Whether those substitutes be solid, liquid or gaseous is beside the point. The transfer of any substantial consumption from products now being consumed to new products disturbs whatever equilibrium there may be in the industry, both in operating and in distribution.

Perhaps the operator will feel that the growth of substitutes is not his problem. In the Middle West, where anthracite is so nearly out of the picture it occupied so completely only

a few years ago, the retailer is still doing business at the old stand. Fortunately for the industry as a whole, the change came at a time when the available substitutes were other coals, or their product, coke. It was comparatively easy to change physical plants and methods to adapt the retail business to the new demand and supply it.

Today the same change is going on under our very eyes in other localities. At the national capital many of the larger retailer have gone into the liquid-fuel business to retain their markets. If the change had not been in process in the Middle West for years, the retailers in that section would be in the oil business today.

What attitude have operators as a class toward distributors? Do they treat them all alike? And should they?

MANY answers to our inquiry bring up this point and it is an important one. One answer stresses the need for uniformity of practice between the producer and two competing distributors of equal standing in the same community. Another deplors the apparent uniformity of practice between the producer and two of his customers in the same community, one of whom is a recognized retailer of integrity and responsibility, the other a fly-by-night without equipment or financial standing. Another protests the distribution of domestic coal through industrial plants.

Closely allied with this is the disposition of over-production. Methods vary. One producer asks his salesman to prostitute his acquaintance with retailers to get them to take in distress coal at circular when they don't need it and when it costs extra yard expense to store it. Others slip their extra coal to jobbers or distributors of doubtful standing,

either at circular or at what the traffic will bear. The irresponsible distributor cuts his price below a living margin to move the coal; then he can't pay his bills.

Certainly this is no retailer's problem. And the cure is so easily put: Don't mine any coal until it is sold (unless you store it under your own control). Don't sell it to anyone who can't or won't pay for it. Don't encourage distributors who are using your products to ruin your markets.

Then there is another group of suggestions that can be grouped together. They all hinge on the idea that the final goal of both branches of the industry is the ultimate sale of coal to the consumer. That's a simple concept, but it's difficult to grasp, because of the schooling we have all had. The sales departments of the operators have concentrated their fire on the retailer. The retailer has exercised his best efforts to outsmart the operator in the same transaction.

ALL THIS time both branches of the industry, instead of bickering with one another over intermediate sales, should have been using their best combined efforts to increase sales to the final user. There is a marked tendency in this direction today; but a great deal of whatever effort there is, is misdirected, if our correspondents know their business. In some places, they say, the pendulum has swung over too fast. The don't-give-a-damn of yesterday has been succeeded by an apron string. The operator is pampering the retailer. The retailer is babying his customer.

Among the various things which may be grouped within this class are misplaced advertising efforts, such as: consumer advertising by individual operators without a proper analysis of local needs; production and shipment of "dealer helps" without consultation with the retailer, "with absurdly partial copy and the dealer's name misspelled on them," as one correspondent puts it; the substitution of expensive service programs for adequate merchandising and advertising.

All our correspondents are not in entire accord on the details. Some hail the service organizations set up by operators as the dawn of a new era; others believe that the creation of these organizations is an inefficient substitute for an adequate program in mass selling, utilizing paid space and good copy.



MILTON E. ROBINSON, JR.

"Instead of education of the general public on broad lines we have now taken the tangent of individualized personal service to each customer," writes one correspondent. "We have cleaned out his furnace for him at great cost to ourselves, instead of advertising to him and educating him how to take care of his furnace through general channels of publicity. We don't seem to see that such selling is so expensive as to become prohibitive in the long run."

MANY of our correspondents have emphasized the necessity of an intelligently worked-out seasonal variation in wholesale price, freight rates if possible, and retail margins, the purpose being to obtain as nearly as possible an even flow of coal from mine to consumer throughout the year. In anthracite the retailers know pretty well what the spring reduction will be, and when and how the increases will come as fall approaches. But they have all found by bitter experience that a seasonal reduction of 50c., which amounted to nearly 10 per cent of the retail price when the system went into effect a quarter century ago, won't fill the bill today when it amounts to about 3 per cent. The

public won't buy things when they don't need 'em to save 3 per cent. Who would buy a \$5 straw hat in October for \$4.85?

This is an operator's problem. The retailer wants to sell coal the year 'round, and given an intelligent price program he will show increased summer volume.

In bituminous the subject is a little more complex. In the marketing of smokeless coal, for instance, the retailer rarely knows until the end of one month what the operator is going to charge the next. In the spring he does not know when rock-bottom prices will be reached. Sometimes he is assured that they have arrived in April or May, only to find in August that a new "rock-bottom" is announced. If, as a result of the new wholesale quotations, there is a new low price quoted to the ultimate consumer, there is hell to pay!

Of course the result of all this is a tendency of the retailer to refuse to buy in the spring until mine prices are cut to the bone. Then, he feels, he is pretty safe in buying. And he usually is, but not always. And naturally the operator resents this attitude. But he has only himself (and his competitor) to blame. Here again is an operator's problem. The retailer wants summer tonnage just as much in Ohio, Michigan and Illinois as he does in New York, New Jersey and New England.

AND now for a word about the retailers' obligation: He should, (says one correspondent from Kansas): "(1) Share alike the burden of advertising; (2) quit (!) substitution; (3) conduct business in such a manner that it will bring credit to the coal industry; (4) co-operate with the producer to help solve his problems; (5) confine his purchases to reputable producers and wholesalers only."

Two others deserve to have their say. This one from Philadelphia: "I believe the retailers in every locality should have uniform prices if such a thing could be brought about without infringing upon the Clayton act or the Sherman law.

... I have observed in those communities where uniformity exists the consuming public looks more favorably upon such commodity groups."

"And last, but by no means least," says a New Jerseyite, "the retailer should pay his bills promptly." To this, at any rate, our operator friends can say Amen.

In February

The first installation of a Simon-Carves washer in the United States was recently made at the North Side plant of the Jones & Laughlin interests in Pittsburgh. A few weeks ago this plant and what it is doing were inspected by a member of the editorial staff of *Coal Age*. His story will be one of the feature articles in the February issue.

MECHANIZATION IN 1928

Main Weapon in Battle With Substitutes

MECHANIZATION in the loading of coal and in the cleaning of it after it has been loaded made remarkable progress during 1928, though both kinds of mechanization are now becoming so general as to excite less remark than at an earlier stage of development. The glint of newness is departing. Especially is that true in regard to loading equipment. Engineers are more interested today in the absence of mechanization than in its use and in the articles of this symposium which follow much stress on the excuses and reasons presented for the failure to mechanize.

The growth in mechanization in some sections and with some companies has been phenomenal. Thus the Union Pacific Coal Co. reports that it loaded with mechanical devices last year 1,501,200 tons, or 51.3 per cent of the total derived from all mines. But other regions, like Colorado and eastern Kentucky, are lagging, the latter because the partings cannot be separated from the coal and because the clay is lifted when coal is mechanically loaded. When mechanical cleaning is introduced this objection will be removed and then the coal marketed will be better than ever.

Nor can such changes be safely delayed. In places, pipe lines are being laid to carry natural gas to cities

and how far their ramifications will extend depends on the price of coal and its quality. Every village along the pipe line becomes a user of the gas. Where the pipe lines come they are likely to stay till the gas ultimately fails. So also with oil. People are not disposed to spend a thousand dollars or more for an oil tank and an oil burner, but once they do, they are likely to continue to be customers for oil till the equipment fails.

Low-priced coal therefore is a requisite if business is to be retained. One's competitor is more than likely to be the man who sells gas or oil than the man who sells another grade of coal. The whole industry has a common fight to wage against substitutes, and it cannot do it by belittling them, but by holding down price by better mining methods and by improving quality. Coal operators now know that they must either mechanize or close their properties. The experimenting has been done and there is no longer any excuse for failure unless conditions are unusually adverse. Mechanization of drilling, loading, dumping and cleaning will extend apace in 1929. Another form of mechanization is in the handling of coal cutters. One of the hardest of mining tasks is unloading and loading cutting machines. That also, as Mr. Garcia remarks, must pass with the years.

Illinois Plans for Future Development

By JOHN A. GARCIA
Consulting Engineer,
Chicago, Ill.

ONLY in labor relations and in strip mining did the coal-mining industry of Illinois make definite progress in 1928. Little was done to construct new plants or to make major improvement at shaft mines though it would be easy to conclude that something was stirring in the minds of practically all coal men from the number of cost estimates made for cleaning and preparation developments by manufacturers and engineering companies. Mechanization should not be attempted without first providing the facilities for cleaning the coal so loaded, and in anticipation of a solution of the machine-loading problem the wise operator is figuring how best he may prepare his product.

Although the quantity of machine-loaded coal has increased there has

been no marked advance, except possibly in the number of pit-car and hand conveyor loaders. Thus so far as mechanization of Illinois mines is concerned, the year 1928 may be set down as a period of study and investigation.

Much progress has been made in the development of new methods or means for shooting down coal at the face, and the results of the experiments and study in this department of mining in 1928 will have an important bearing on the blasting methods in coal mines in the future.

The use of an inert gas in a cartridge, thus permitting day-time shooting, became standard practice in 1928 at several large Illinois mines. Steel cartridges with highly compressed air have been successfully used in the

southern field, and we may expect to hear much about this in 1929, as well as of the use of black powder and permissibles in conjunction with steel shells and mechanical stemming.

In 1928 a prominent engineer was sent to France to investigate the method of blasting by means of liquid oxygen in a steel container. During the year the inventor, the chemist and the engineer got together in an effort to eliminate the windy shot, the powder explosion, the excess of smashed coal, and the year must be credited with constructive effort by the technician toward the solution of a problem of vital moment to the miner and operator alike.

The track-mounted cutting machine got a real start in Illinois in 1928, and experience to date seems to indicate a rapid increase in the sale and use of this type of cutter. Now that the manufacturer has developed a coal-cutting machine that operates from the track and can be moved from face to face with minimum

labor, and very quickly too, there seems no reason for the continued use of the present type that requires such strenuous physical effort to remove it from the truck, pry it to its sumping place and after cutting, pull, push and jack it about to place it on the truck again. The year 1928 may be credited with demonstration and proof that this type of cutter is a practical machine adapted to the coal-mine conditions of Illinois as well as in other states. Its minor imperfections will be overcome by experience, and then another back-breaking job will have been taken from the work of mining coal.

IN strip mining 1928 was a year of constant and phenomenal development. The improvement in shovel design has been so rapid and radical that obsolescence of machinery used in stripping becomes an item of major importance on the cost sheets. Two

years ago a 12-yd. shovel was about as far as any conservative stripper cared to go; then came the 15-yd., and now a 20 is being designed. The increase in size and working range of the shovel naturally increased the limiting thickness of overburden that could be removed with profit, and in 1928 this limit was further expanded because of the development of the dragline and its application to strip operation in conjunction with or preceding the shovel.

Add to the above the use of liquid oxygen for blasting thick rock in the overburden, shearing machines for cutting the stripped coal, gas-electric motors for hauling self-dumping cars, complete electrification with purchased power—all, plus a background of experience with its many lessons, and no prophet is needed to tell what probably will happen in the coal-stripping business in the years to follow 1928.

of explosives is receiving merited attention from many companies.

Entry driving and other development work has been improved and speeded by mechanical means so that one mine operator has been able to report that he was able to develop a mine from the slope opening with four entry mains to the boundary and bring a rib line up to a 1,500-ton daily production in less than 18 months. He was able with entry-driving machines to develop at a rate of 15 to 20 ft. per shift per entry. The economy effected paid for the machine in less than six months. Additional installations attest that entry driving with conveyors is showing steady progress.

IN THIN seams conveyor loading has been steadily increasing during the past year. Beds so thin as to be inaccessible to hand-loading methods are now being worked by conveyors. Practically all the long and open-face methods of mining with conveyors have been displaced by room-and-pillar plans calling for the working of a single room or a pair of rooms per entry. This retreat from extensive working faces or series of faces was forced primarily by local failures in roof control and congestion of traffic.

All this does not apply to the "V" or other systems of scraper loading from long faces. These have steadily expanded. Some companies have more than doubled their installations. The extraction of chain and barrier pillars, long a bugaboo of the mining profession, has been a fertile field during the past year for loading by scraper wherever the bottom has been hard enough to permit of its use. With scraper operation the quantity of slate to be loaded is greatly decreased, and the pillars are removed much faster, more cheaply and more safely than with hand loading.

During the past year ventilation has received additional attention. One company after making an exhaustive study of its underground conditions succeeded with the aid of hitherto unrecognized technical methods in increasing the total ventilating efficiency of its mines 10 per cent with a saving of \$30,000 in one year.

Another company, by determining the load center of ventilation of a group of mines and sinking an air-shaft near this point, succeeded in increasing the output of a single fan approximately 100,000 cu. ft per minute with a decrease in water gage from 2.3 to 1.8 in.

In Pennsylvania the Records of 1927 Became Averages in 1928

By C. H. DODGE

*Assistant Engineer,
H. C. Frick Coke Co.,
Scottdale, Pa.*

CONSISTENT and notable progress in the methods of mining, loading and transporting coal has been made during the past year in the bituminous coal fields of Pennsylvania. Concurrently, increased efficiency has been shown in the preparation of the raw fuel for domestic and industrial consumers.

In the thicker coal seams short-wall mining machines have been replaced in noticeable numbers by arcwall and shearing machines operating from the track. Thereby the tonnage cut has been increased from an average of 200 tons to between 350 and 500 tons per machine shift. By this change also the operating cost has been reduced between 15 and 40 per cent. The machine coal loader's capacity has been correspondingly increased. During 1928 an output of 20 to 25 tons per loader was not uncommon in Western Pennsylvania.

Drilling in the thicker seams has been made more efficient by changing from hand-held and hand-directed power drills to those which are machine-mounted and are operated from mining or individual track machines. By this change not only have the holes been better placed,

with resulting better coal preparation and better roof and rib conditions, but the drilling costs have been lowered.

Mining methods have been modified and improved and in some cases entirely replaced by others. In the face of the 95- to 96-per cent recoveries now being obtained in some of the more valuable coal deposits, recoveries averaging 85 per cent are no longer countenanced. Timber recovery has advanced in some instances from a negligible figure to 60 and 70 per cent. This latter economy has been made possible by changes in mining methods and increased inspection. The emphasis now laid on this form of waste elimination has greatly aided in bringing it about.

Coal preparation underground has been improved as a result of a closer study of local coal characteristics and a more intelligent application of available explosives. As a result the yield per pound of explosive has increased from 4 to 10 tons with no decrease in the percentage of lump coal. A non-explosive blasting device which is a newcomer of the past year to the Pennsylvania field

THIS same principle of locating load centers in the mines has been applied also to the electrical supply. The establishment of substations close to the load centers has not only reduced line losses but has afforded a more steady supply of electricity of the desired potential at the working face.

Better informed, more capable and more enthusiastic underground management, backed by time studies and research efforts, have lifted many large mechanical coal-loading operations from the experimental stage to a place in the accepted operating family. Several operations load 800 to 1,200 tons of coal mechanically every working day. As one leading coal operator, in referring to the tonnages loaded mechanically per machine and per shift, has said, "The maximums of 1927 are the averages of 1928."

The mechanical loading of slate has made large strides. The cleaning of aircourses, the loading of rock in the construction of air crossings and the grading of haulageways used to be slow and costly. Now the work is done in many places by machines in a third to a fifth of the time and at 15 to 25 per cent less cost.

During the past year another exemplar has been added which will exhibit the advantages that can be derived from a merging of the locomotive haulage systems of groups of mines into a common conveying system carrying 15,000 to 18,000 tons a day from a central point underground to a single outside loading point. This plan has made possible an increase of several thousand tons of daily output per mine, has considerably reduced underground haulage costs and has provided a further saving in the difference between the costs of railroad and water-freight service. The intermination and other intermine difficulties have been satisfactorily adjusted.

MUCH advance has been made in the electrification of mines, especially in hoisting and ventilation. Safety of the miner, reduction in operating and maintenance expense and increased production have been the prime movers which set these developments into action. The past year has seen one company which produces in excess of 35,000,000 tons of coal per year complete the electrification of 70 per cent of its larger mines.

Coal cleaning has occupied a large section of the stage during the past

year. Present practices would indicate that the blockier coals of the thick coal seams of Pennsylvania are more amenable to wet-cleaning methods than to dry and that the more friable and splinty coals of the thinner seams are best adapted to dry cleaning.

Slack coal from the Pittsburgh seam containing 10 to 15 per cent ash can be cleaned to give a market product with approximately 5 per cent ash or a run of mine product with 6 to 7 per cent ash. From this same seam coal with 8 to 10 per cent ash used to be shipped. Such ash reduction is a tribute to the research engineer's efforts in coal cleaning.

Coal tipples also have followed the same trend as mechanical loading plants. One recently completed handles 800 to 1,000 tons per hour, loading six sizes of coal separately or in any combination of plus 6-in., 4x6 in., 2½x4 in., 1x2½ in., ¾x1 in. and

minus ¾ in., each size having a separate loading track and four of the six sizes are being loaded by inclined booms.

The increased membership and attendance at meetings of the various coal mining institutes of engineers, operators and those otherwise associated with coal mining during the past year have attested the widespread interest in the advance of technique in the bituminous fields of Pennsylvania. In those who attend these meetings the line of demarcation between the so-called technical and non-technical phases of coal mining becomes more and more blurred, to the benefit of both groups.

Technical progress appeals to labor on the ground that it will "make labor less difficult, increase the capacity of man and machine and split the margin of profit, attributed to these efforts, fairly between labor, management and capital."

Day of Hand-Loading Mines Is Past

BY CHARLES GOTTSCHALK

Vice-President, Big Vein Coal Co.,
Evansville, Ind.

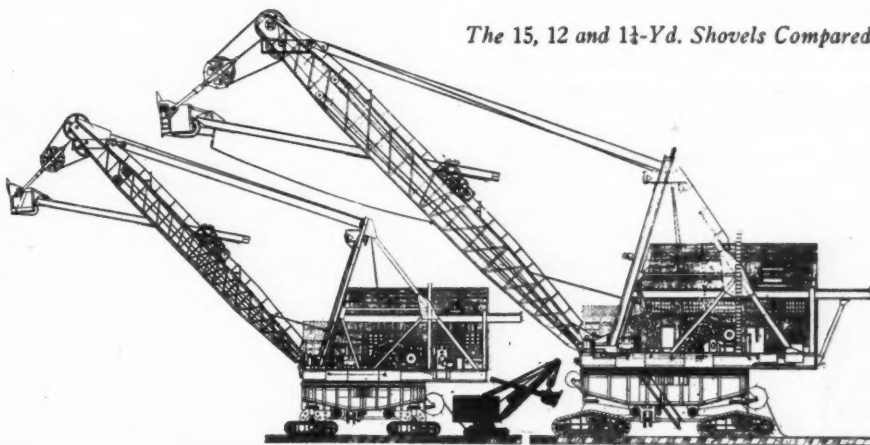
PROGRESS in engineering technique has been quite generally restricted in the State of Indiana during 1928 by the inadequate demand and the consequent low output. Almost all are agreed, however, that the day for opening new mines on a hand-loading basis is past.

During the year just ended possibly a dozen mines in this state have demonstrated that, with mechanical loaders and suitable auxiliary equipment, production can be maintained under conditions that would positively eliminate the operation if the mechanical aids to loading were omitted. The tendency of companies with a year or more of mechanical loading experience

has been to plan for increased efficiency by further investments in equipment.

Mechanization, however, has intensified old problems, bringing increased percentages of fines, more difficult preparation and a greater volume of combustible refuse. In an effort to reduce the percentage of fines, substitutes for standard explosives are being tried; slabbing and shearing machines are coming into greater prominence and mine workings are being projected better suited to the use of modern machinery.

Most mines which have substituted mechanical for hand loading have had to provide more picking-table space



The 15, 12 and 14-Yd. Shovels Compared

and to screen and pick the entire output, remixing the product when mine-run is to be sold. The problem of gob disposal has not been satisfactorily met but it is recognized that it involves in most instances the recovery of a part of the refuse and the disposal of the remainder so that it will not fire and pollute the streams.

In strip mining the steam shovel is rapidly giving way to complete electrified units which have speeded up excavating operations materially, thus increasing the acreage in Indiana available for stripping. Seeing that the life of individual stripping concerns will be lengthened, the erection of modern preparation plants is justified and the resultant product cannot be distinguished on the car from coal prepared at shaft mines operating in the same seam.

An important development of the past year in strip mining has been the

operation of a dragline in parallel with the stripping shovel. By this means it has been possible greatly to increase the yardage excavated ahead of a single loading unit and transportation system. Prior to this innovation the ratios generally existing between the thickness of the overburden and that of the coal were such that the output of the stripping unit was insufficient to utilize fully the possibilities easily obtained from a minimum investment in loading shovel and tracks. Improved methods of blasting overburden also have been developed at various stripping operations in Indiana.

Though the output for the state for 1928 is less than normal much progress has been made in establishing the fact that Indiana coals may be marketed economically when the problem is properly analyzed and suitable mining equipment selected.

The whole cut was loaded out in one shift; the next cut was then made ready to be loaded out on the following day. A shaker conveyor is used on this slab. The three shaker conveyors load onto a scraper conveyor or on the entry. At first a shaker conveyor was used here also, but the loading in the rooms was so heavy it could not take the coal away fast enough to keep the face conveyors going.

More complete extraction was obtained by slabbing in the opposite direction, but then the primary object of the installation was defeated, as the weight carried ahead far enough to break the slate over the advance work. In the present system most of the coal is extracted before troublesome weight develops, giving a recovery of about 82 per cent. At the loading point 15 cars are handled by an electric hoist until loaded. A locomotive hauls them to the sidetrack.

The Kenmont Coal Co., on Buckeye Creek, has been using two Eickhoff shaker conveyors for the past two years for driving entries. Experiment was made with a duckbill but it was abandoned for loading by hand. Thus used, about 30 ft. is driven per day.

On Montgomery Creek the Racoon Coal Co. is operating an Eickhoff face and loading conveyor in mining the No. 4 seam, which is about 38 in. thick and has a good roof without drawslate. With conveyors two narrow rooms are driven in pairs at 30-ft. centers, the pairs being 200 ft.

Without Mechanical Cleaning Loading Equipment Lags

By W. NORRIS COLE

Mining Engineer,
Kentucky River Coal Corporation,
Hazard, Ky.

BECAUSE the drawslate is treacherous, bone partings are frequent and the bottom is soft and especially because of the lack of mechanical coal-cleaning equipment, southeastern Kentucky has but slowly advanced in the mechanization of its loading practice.

The most successful installation is that at the Knott Coal Corporation's mine on Carrs Fork, where a Goodman electro-hydraulic shovel has been working for the past two years. The plan of operation is shown in Fig. 1. The coal seam is 8 ft. thick and is locally known as No. 9. It has about 100 ft. of cover with an excellent roof. The one loader installed produces on an average 180 tons per shift. The pillars are withdrawn by hand loaders with a total recovery of about 95 per cent.

A large company on Lots Creek has been experimenting for about a year and a half with shaker loaders of different types. In the part of the mine in which work is now being done the drawslate runs from 6 to 30 in. With hand loading this must be pulled down after every cut both in entries and rooms. While fairly clean coal can be obtained on the advance it is practically impossible to keep the

drawslate which lies over the pillars from crumbling and getting into the small sizes. The equipment was installed so as to get practically all the coal on the advance, thus obtaining a cleaner product rather than increased tonnage or cheaper extraction.

Many plans have been tried, but Fig. 2 shows the most successful of these, keeping in mind the precise results desired. The narrow rooms are driven 15 ft. wide from one entry to the other with the aid of a duckbill and shaker conveyor, two of these rooms generally being driven at one time. When room No. 3 was driven through, the pillar was slabbed back with a longwall mining machine toward room No. 2.

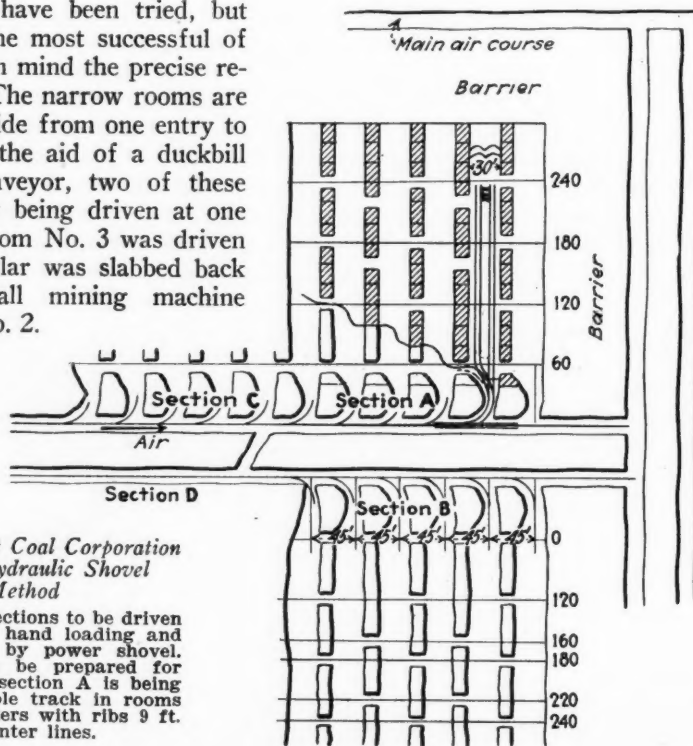


Fig. 1—Knott Coal Corporation
Electro-Hydraulic Shovel
Method

Rooms in sections to be driven to 0 + 70 by hand loading and rest of way by power shovel. Section B to be prepared for shovel while section A is being driven. Double track in rooms on 12 ft. centers with ribs 9 ft. from these center lines.

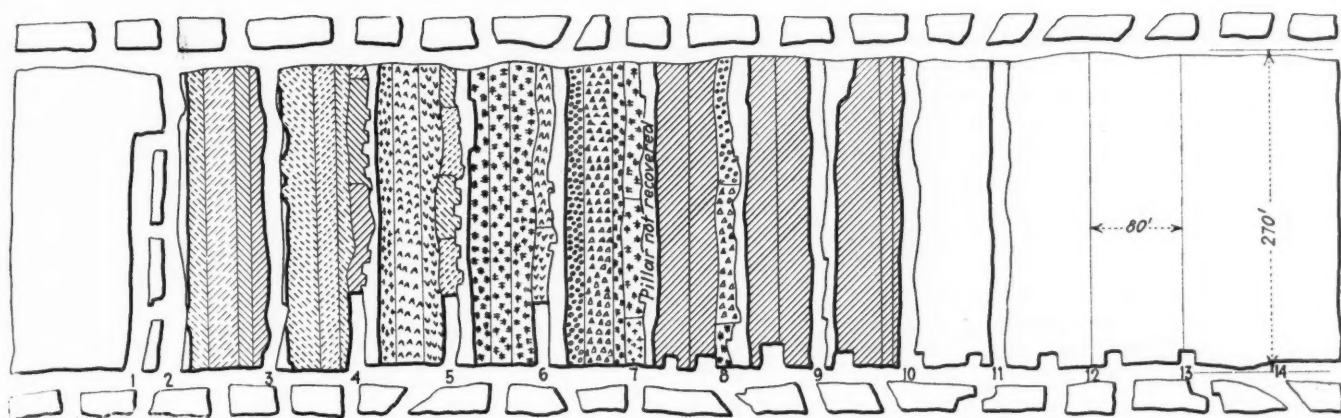


Fig. 1—Some Lots Creek Coal Is Mined by Slabbing With Help of Shaking Conveyors

apart. They are driven to a depth of 200 ft. The big pillar has been slabbed out to a 40-ft. entry stump which will be recovered by hand loading on retreat. At present the conveyor is loaded by hand in driving the narrow places, but a special shovel is being made for that purpose. Insufficient progress has been made to demonstrate the practicability of this mining method, but so far it is giving satisfaction.

At Dakota the Blue Jacket Coal Co. has been using two Goodman

shovels for the past year. "Loader sets," or narrow rooms about 15 ft. wide, are driven 200 ft. on 100-ft. centers. The pillar is then slabbed out on an angular face down to about a 40-ft. entry stump. The system is practically the same as the foregoing except that the big pillar, in this instance, has been made 100 ft. wide instead of 200.

This operation also is in the No. 4 seam and where roof and bottom are good the system has worked well, giving increased tonnage and a larger percentage of lump coal, but when drawslate or soft bottom is encountered scrapers do not prove satisfactory. However, it would seem that if the coal were mechanically cleaned the loaders would give satisfaction throughout the mine and the product would be cleaner than it is now with hand loading and no cleaning equipment.

Quality West Virginia's Aim In Year Just Past

By OSCAR CARTLIDGE
Consulting Engineer,
Charleston, W. Va.

LADING machines and conveyors have made some progress in West Virginia during the past year and mine cars of increased capacity have been installed. In the last few months an unusual interest has been shown, especially in the smokeless field, in the sizing and cleaning of the finer grades of coal, particularly by the air-washing and the hydro-separator processes, one company and its affiliations having installed no less than 24 separate units of the latter type.

In matters mechanical West Virginia operators have indicated interest, but that in most cases is as far as they have gone. Fewer tipplers were installed in 1928 than for several years, and most of these were small.

Until recently West Virginia has been rather backward in the cleaning of prepared sizes, relying on unusual inherent purity to satisfy market demands. Competition, however, is compelling a reversal of this policy and a decided change in this phase of the business may be predicted for the coming year.

Few notable plants have been

erected, but one in particular deserves mention, for it is unusual for a railroad to go to such extremes in preparing its coal. This plant was built by the Fuel Mines Operations, of the Chesapeake & Ohio Ry., and includes

1,400 ft. of rope-and-button conveyor, shaking screens, picking tables, loading booms and auxiliary machinery sufficient to handle 300 tons per hour.

In the New River field much development work has been done with shortwaloaders and conveyor-loaders, and a mine in Logan County has been successful with a power shovel. Joy loaders have been operated with success in the northern area and the Coloder, in the Pocahontas region, as usual has loaded the largest percentage of machine-handled coal.

Mechanization and Safety Go Forward Together in Alabama

By MILTON H. FIES
Vice-President in Charge of Operations,
De Bardeleben Coal Corporation,
Birmingham, Ala.

DURING the past year Alabama made many steps forward. One needs only to review the pages in the October, 1928, issue of *Coal Age*, which deal with Alabama's progress, to reach that conclusion. The chief source of satisfaction, however, is the fact that there were only 66 fatal accidents in 1928 whereas there were 93 in 1927. Despite the drop in yearly production from 20,190,926 tons to approximately 17,500,000 tons, the fatal accident record per

hundred thousand tons produced was the lowest in the history of the state, due in large measure to the vigilant and thorough inspection service of the State Mining Department under the energetic and able guidance of W. B. Hillhouse, chief inspector.

Wherever black blasting powder was still used—notably in the Cahaba field, where domestic coal is produced—a decided effort was made during the year to replace black powder by permissibles of a type having a low

rate of detonation. Many mines have introduced electric shooting and employed shotfirers. In some cases the coal is shot when men are in the mines and in others after they have left. Three large mines have installed electric cap lamps and many others have made contracts for such installations.

A persistent effort has been made toward further mechanization. Seven mines in the Cahaba field are producing coal successfully with mechanical methods, and in the Warrior field several large producing companies have made progress in that line. That the thin seams of the state favor mechanization is self-evident. It is a travesty on sound engineering to limit the size of mine cars to, say, 1,000- to 1,400-lb. capacity just so that they can be pushed 150 ft. into a room, say 30 in. high, when they have to be hauled 2 miles or more on an entry 6 ft. high and so could be made much more capacious for that far longer portion of the journey. In Alabama the coal will be brought from the rooms or walls in these thin seams to large-capacity cars on the entries. The reduction of haulage cost alone

will make such methods worth while.

Two large tipples in the Warrior field have been adapted to Sanford-Day drop-bottom cars, and the same type of equipment has been installed at two mines of medium capacity. In the two larger mines the average daily production was increased 50 per cent.

One of the large iron-producing companies erected a new village, sunk a rock slope and improved its ventilation and haulage. Another sunk a shaft to the Mary Lee seam and will spend \$900,000 in development. Two large washers have been built in the Warrior field and one company has contracted for a pneumatic separator to clean 2,500 tons of coal per day.

Dolomite No. 1 and No. 3 were combined, and at present all the coal comes through the latter opening. The entire tonnage at Lewisburg is hoisted up No. 2 slope, No. 1 having been abandoned. A large steam-shovel operation was developed during the year at Holly Grove, in Walker County.

Thus in Alabama the engineer, always an insatiable optimist, has been on the job. In 1929 he will be equally alert.

"Let Power Do It," Still the Slogan In Wyoming Field

By A. W. DICKINSON
General Superintendent,
Union Pacific Coal Co.,
Rock Springs, Wyo.

IN THE year just completed probably 2,460,000 tons will have been loaded by mechanical means from underground mines in the State of Wyoming. Three more mining companies mechanized their loading operations during the year. A total of 39 per cent of the total estimated production was loaded by machinery and that in a state producing 6,250,000 tons annually.

Where the bottom is approximately horizontal, machines of the tractor and gathering-head type in general were installed. In pitching work scrapers of large size continued in operation but no new units were added. Many conveyors of the shaking type, with and without duckbills, were placed in pitching places during the year. Light-weight conveyors of the pit-car loader type also were added in some of the low-pitch workings.

In all mines employing mechanical devices for the loading of coal the operating areas have been quite definitely reduced, with resultant econ-

omies in ventilation and upkeep. Much interest was developed during the year in the cleaning of coal at or near the working face, and it was found that impurities may be picked satisfactorily from a shaking conveyor wherever ample lighting facilities are provided. The light for the picking of impurities can be made just as efficacious as that now found in large preparation plants on the surface. The loss incident to conveying and handling thousands of tons of impurities to and from the point of preparation can be minimized by underground cleaning.

During 1928 shothole drilling became almost entirely standardized, the practice being to breast the holes with 1½-in. or 1¼-in. diameter drill steel, using electric rotary drills. The use of a diamond point on one wing of the cutting end of the drill steel aided greatly in the breasting of the holes. Further economies were effected by the reduction of the weight of the unit stick of permissible from ½ to ¼ lb.

This not only saves in explosive but also increases the percentage of lump coal.

A departure from previous practice has been the application of the shaking pan and duckbill to a straight or long face. A place is prepared similar to that used in scraper work either in pitching or level coal, the thickness of which may run from 20 in. up. After the rib of the face has been undercut, lagging is placed against timber at the point where shots are to be fired and thus a coal bin is created from which the duckbill can load out for the length of a conveyor pan. Thereafter another series of shots can be fired and another conveyor pan and yet others can be added advancing up the face for its entire length. Protecting timber can be placed at will. The method holds forth the greatest promise of any yet attempted in mechanical loading, and yet the equipment is simple and inexpensive.

Mechanization in Colorado Halted by Difficulties

By R. M. MAGRAW
Manager, Rocky Mountain Fuel Co.,
Denver, Colo.

Colorado has not, up to this time, fallen into step with other mining districts of the country as to mechanization, for its physical conditions have been adverse to any development of this kind, so that it has been unable to keep pace with the better favored regions by which this advanced phase of coal mining has been developed.

Experiments, however, have been made on a small scale at a few operations, but the plans have not been extensive enough to show beyond cavil how successfully machinery can be used in the state in the mining of coal.

None of the mines recently opened have been of sufficient importance to justify their being equipped on a large scale. All the developments of the year have been made in accordance with the unwritten standards of recognized mining practice.

Several mines have been closed, some permanently, with the idea of concentrating the productive effort on fewer operations having, possibly, a steadier working schedule.

All operators are expressing hopes of larger markets and thus larger production and more favorable marketing conditions. Should these come they naturally will be followed by increased mechanization of mines.

With Markets Overrun by Substitutes Utah Mechanizes Its Mines

By A. C. WATTS
*Consulting Engineer,
Salt Lake City, Utah*

IN Utah much effort is being made to meet the requirements of a fastidious market and the keen competition from oil, gas and hydro-electric power that is faced in practically every district which Utah coal enters. No startling developments or radical changes were made in 1928.

Mechanization is being adopted gradually. With mines originally developed for hand mining, loading-machine operations have been adapted to the conditions as found. As their limitations and advantages are learned, mine developments are planned accordingly. More thought is being given to their scientific control. With thick coal beds and very heavy cover, roof control presents many problems which must be carefully solved, as the rapid recovery of coal by loading machines creates a different roof-action from that resulting from old-time hand methods in room-and-pillar workings.

Many kinds of machines are found in the Utah mines. Among the types of loader used are the Jeffrey, Sullivan, Goodman (both with and without the roof jack), Joy, Thew, Conway, Mancha Coalgetters, scrapers and Eickhoff conveyors with duckbill loaders. The type used depends on the judgment of the operator and possibly on the persuasiveness of the salesman. It will be some time yet before a well-defined mining method will be devised in this state to meet the conditions which mechanical loading imposes.

The historic old Winter Quarters mine, which was opened in 1878, was closed during the year. But the loss of this mine has been compensated by two new operations, the National Coal Co. and the Gordon Creek Coal Co. These two mines are within a stone's throw of each other, in the Gordon Creek district of Carbon County.

IN the Castle Gate district another new operation was started this year by the Peerless Coal Co. An inclined shaft is employed for reaching the coal, which at the point of attack lies about 800 ft. beneath the surface. This is in marked contrast to the drifts, slopes, shafts and long outside inclined planes used to develop coal mines in other parts of the state. At present rate of progress the coal bed

will be reached about the middle of 1929. It is said this mine will be laid out for complete mechanization.

The fastidious markets served by Utah coal have caused the erection of two large and complete screening plants, one for the Liberty Fuel Co. mine at Latuda and the other for the Utah Fuel Co. at Castle Gate. With these completed all the large operations of the state are equipped with modern facilities for preparing coal for the market. The two new pro-

ducers, National and Gordon Creek, have the Miller type of screens, which are new to this state.

A start has been made in the use of Cardox for shooting but as yet information as to the results has not been available. Because the laws of the state prohibit shooting during the working shift it is difficult to prepare enough coal to keep mechanical loaders in action without excessive loss of time in moving, hence the desire to introduce a substitute for blasting powder.

One more mine has been added to the users of hydro-electric power. This was accomplished by a 72-mile extension to Sego, in Grand County, from the Utah Power & Light Co. line at Columbia.

Anthracite Region Already Has Loaders But Should Install More

By R. V. NORRIS, JR.
*Consulting Engineer,
Wilkes-Barre, Pa.*

AS IS well known, the calendar year 1928 was one of broken time and lower prices due to lack of market, warm weather, and the invasion of anthracite territory by substitutes. For this reason much of the time devoted to engineering was directed to the study of possible economies in operation, making it impossible to achieve notable progress in any one line.

Several studies, however, were carried forward from previous years, the most important of these being on the effect of second mining on upper beds and on the surface. Second mining in this district can hardly as yet be called general, and the effect on upper beds due to the second mining in panels of lower beds cannot be taken as conclusively proving the effect to be expected when large areas are exhausted. For this reason opinions as to the effect of second mining are contradictory.

This inquiry merges directly into the study of subsidence and the support of workings. Progress has been made in both, with results that cannot yet be considered as final. Flushing with both ashes and culm has been continued with fair results. An interesting experiment has been proposed for one colliery threatened with a general squeeze. A line of chambers is to be packed with mine rock entirely across the property in hope of breaking the roof and relieving the weight on the remaining pillars, so

that the coal in them may be more completely extracted.

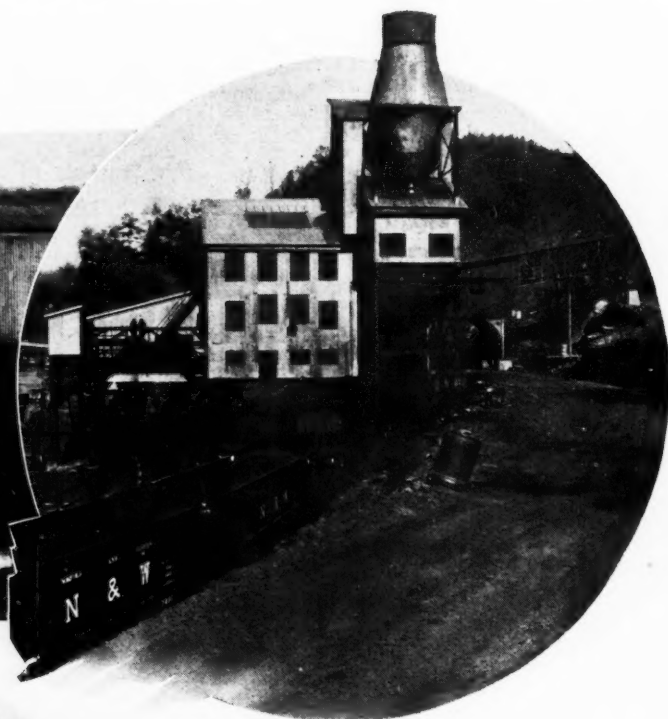
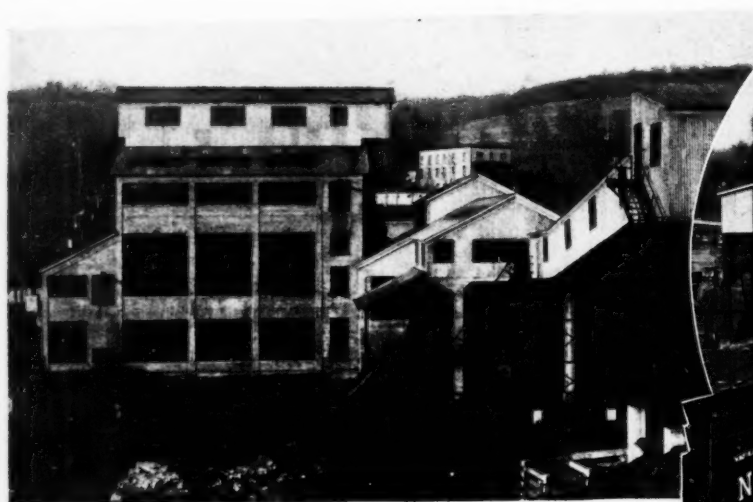
From a mechanical standpoint more progress has been made. The use of automatic and remote-control electrical devices has been extended, especially in connection with pumps, substations and fans. This equipment is so reliable that it has become almost standard for new installations.

The number of loading machines in use has increased slightly with a trend toward scraper or conveyor loaders, which seem to be better suited to present mining methods. These loaders are used chiefly in thin beds and have made commercially mineable much coal which under hand-loading conditions would have been left. The application of loaders to longwall or modified longwall has been considered and to a small extent loaders have thus been used, but the quantity of coal produced in this manner is negligible.

The use of undercutting machines has not increased materially as in comparatively few beds can they economically be used. Power drills of all kinds are coming more and more into general use, not only in rock but also in coal.

The greatest opportunity for progress seems to be in further mechanization of the collieries, particularly in the use of mechanical loaders and possibly in a change from room-and-pillar methods to some sort of modified longwall.

In the Coal Construction Field In 1928

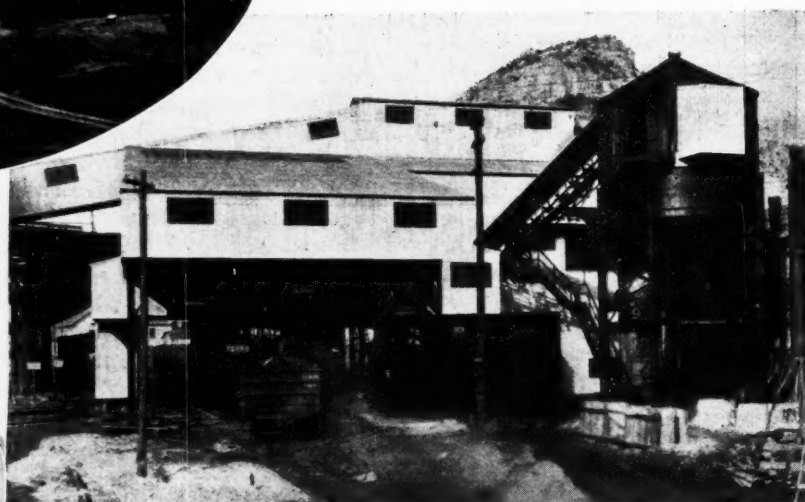


Upper Left—New Tipple and Cleaning Plant, Berwind-White Coal Mining Co., Windber, Pa.

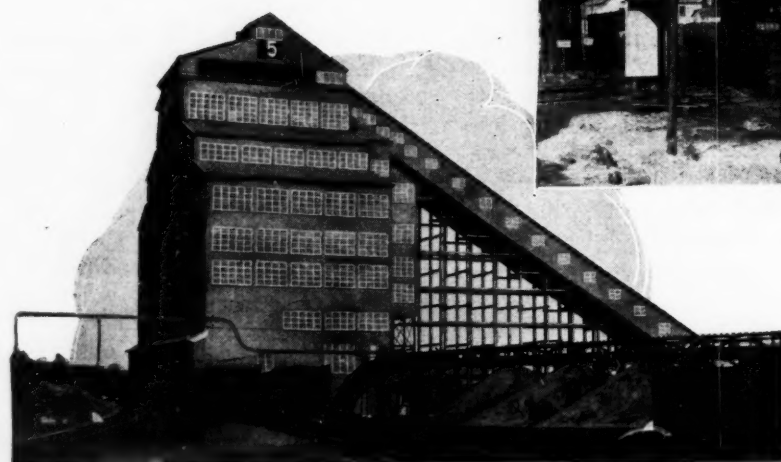
Upper Right—Cleaning Plant at Newhall, W. Va., New River & Pocahontas Consolidated Coal Co.



Above—Black Diamond Washery, Pacific Coast Coal Co.



Above—Castle Gate Tipple, Utah Fuel Co.



Left—Highland No. 5 Breaker, Jeddo-Highland Coal Co.

Mechanical Cleaning Plants Feature Topworks Construction in 1928

MECHANICAL cleaning plants held the center of the stage in new topworks construction in the coal industry during 1928. Data collected by *Coal Age* direct from the field and also through the co-operation of a number of the leading manufacturers of equipment show the installation of new mechanical cleaning equipment last year with an estimated hourly capacity of 9,000 tons.

Using the government figure of 208 eight-hour days as the theoretical average working year in the coal industry, this means an annual capacity of nearly 15,000,000 tons. As a matter of fact the actual total was considerably in excess of that figure because many operators plan to work these plants longer than one shift or shifts longer than eight hours. Moreover, the data upon which the 9,000-ton figure are based do not include wet tables and jigs nor do they purport to cover all the new construction of the past twelve months.

During the year there also was a comparatively large number of plants erected for handling coal by the ordinary screening and hand-cleaning methods. Data collected by *Coal Age* in this survey show installations with an hourly capacity of 11,850 net tons. This figure is exclusive of auxiliary coal-handling equipment installed in connection with the new mechanical cleaning plants and, as in the case of the estimate on new mechanical cleaning capacity, undoubtedly understates the additional capacity made available last year.

The fact that wet and dry mechanical plants erected last year constituted such a large percentage of the total new topworks construction is significant of the new trends in industrial thinking. Obviously a substantial proportion of the operators have ceased to think of coal cleaning in terms of hand methods. The reason for the change is twofold: (1) Producers are giving more attention to

merchandising and are looking more kindly upon sales based upon analysis; (2) mechanical mining is forcing the employment of methods above ground which promise more uniform and more complete removal of impurities.

Pennsylvania leads the states in the installation of new mechanical cleaning equipment, outranking West Virginia, its nearest rival, by a comfortable margin. The Pittsburgh Coal Co., with its three new units using the Rhéolaveur washers and its older Arms plant, will have a mechanical cleaning capacity of 1,775 tons per hour. Peale-Davis tables, developed some years ago at the mines of Peale, Peacock & Kerr, are being installed in two new plants in Pennsylvania and one in West Virginia. The Berwind-White interests have added new units using both the Arms table and the Menzies hydro-separator. The latter type of cleaning equipment has proved unusually popular in southern West Virginia. Thirty-four of these units were installed in West Virginia last year.

Alabama, with its wide experience in washing, revealed little inclination the past year to depart from the types of mechanical cleaning plants with which the operators in that state have been familiar. Some of the producers there, however, have been studying types which have found acceptance in other fields. In addition the state has done pioneering work with a new type of equipment for recovering material from $\frac{1}{4}$ -in. down by means of the Arzinger oil-flotation system. Illinois, which once was interested in wet cleaning, is again in the picture with a Menzies plant.

In the anthracite region a number of new plants and additions to older breakers have been installed. Rhéolaveur units are being added to the Loomis breaker of the Glen Alden Coal Co.; when completed the additions will raise the capacity of the equipment to 8,000 tons per day.

Three new Chance plants were erected last year and a fourth is now under construction; two new cones are being added to the Marvine breaker of the Hudson Coal Co., raising the capacity of the sand-flotation plant there to 6,000 tons a day.

IN the studies devoted to dry cleaning during the past year the conclusion appears to have been reached that the problem of handling dust in dry plants is greatly simplified by resorting to recirculation of the air. Such recirculation also has the added advantage of reducing power costs.

Some of the new installations completed or in the process of erection in 1928 are summarized in the table which appears on the following page. This table gives a skeletonized picture of trends in topworks construction the past year, showing the name of the operating company, location of plant and capacity per hour. Where the topworks included the installation of a mechanical cleaning plant that fact and the system of cleaning installed is indicated.

The summary was made possible largely through the co-operation of Allen & Garcia, American Coal Cleaning Corporation, American Rhéolaveur Co., H. M. Chance & Co., Morrow Manufacturing Co. and the Roberts & Schaefer Co.

Something of the rapidity with which mechanical cleaning is sweeping the mining fields is apparent when a comparison is made between the total installed screen capacity of the bituminous operations and the mechanical-cleaning capacity. In 1927 mines which shipped 383,677,000 net tons, or 79.9 per cent of the total commercial shipments made in that year, were equipped to size coal although little more than one-third of the shipments made by those mines reached the market as prepared sizes. The capacity of plants with mechanical-cleaning installations at the end of 1928 probably exceeded 40,000,000

New Topworks Construction in 1928

Company	Plant Location	Capacity Tons Per Hour	Special Equipment (See Footnotes Indicated)
American Coal Co.	McComas, W. Va.	60	1
Berwind-White Coal Mining Co.	Windber, Pa.	400	2
Big Vein Coal Co.	Buckskin, Ind.	250	..
Black Diamond Coal Mining Co.	Drakesboro, Ky.	400	..
Bottom Creek Coal & Coke Co.	Vivian, W. Va.	60	1
Brown, H. R., & Sons.	New Philadelphia, Pa.	200	..
Buckeye Coal Co.	Brier Hill, Pa.	200	..
Butler Consolidated Coal Co.	Nemacolin, Pa.	125	..
Cambria Fuel Co.	Wildwood, Pa.	1,000	..
Central Alabama Coal Co.	Johnstown, Pa.	250	..
Chafin, Jones, Heatherman Coal Co.	Kimberly, Ala.	25	3
Clinchfield Coal Corp.	Peach Creek, W. Va.	40	3
Consolidated Coal Co.	Dante, Va.	330	2
Continental Coal Co.	Bankhead, Ala.	375	..
Crosier Coal & Coke Co.	Cassville, W. Va.	720	..
Crystal Black Mining Co.	Elkhorn, W. Va.	60	1
Des Moines Ice & Fuel Co.	Lobato, W. Va.	40	3
Elm Valley Coal Mining Co.	Des Moines, Iowa	60	..
Glen Alden Coal Co.	Elm Grove, W. Va.	250	..
Great Valley Anthracite Co.	Nanticoke, Pa.	500	4
Hillman Coal & Coke Co.	McCoy, W. Va.	250	..
Hudson Coal Co.	Jerome, Pa.	400	5
Island Creek Coal Co.	Carbondale, Pa.	190	7
Jeddo Highland Coal Co.	Seranton, Pa.	375	7
Jones & Laughlin Steel Corp.	Holden, W. Va.	750	..
Kingston Coal Co.	Jeddo, Pa.	310	7
Lah Coal Mining Co.	Pittsburgh, Pa.	100	6
Langeliffe Collieries, Inc.	Plymouth, Pa.	125	7
Liberty Fuel Co.	Leith, N. Dak.	125	..
Lynchburg Coal & Coke Co.	Avoca, Pa.	150	7
MacAlpin Coal & Coke Co.	Laruda, Utah	250	..
Majestic Collieries Co.	Kyle, W. Va.	60	1
Madeleine Smokeless Coal Co.	MacAlpin, W. Va.	20	3
Marion County Coal Corp.	Majestic, Ky.	400	..
Miami Coal Co.	Mandeleine, W. Va.	100	..
Mill Creek Coal & Coke Co.	Centralia, Ill.	200	1
Moffat Coal Co.	Clinton, Ind.	275	..
Morrison Coal Co.	Coopers, W. Va.	60	1
New River & Pocahontas Consolidated Coal Co.	Oak Creek, Col.	100	3
Northern Illinois Coal Corp.	Glen Morrison, W. Va.	60	3
O'Gara Coal Co.	Berwind, W. Va.	40	3
Page Coal & Coke Co.	Newhall, W. Va.	200	..
Peerless Coal & Coke Co.	Wilmington, Ill.	500	..
Pittsburgh Coal Co.	Harrisburg, Ill.	275	1
Pittsburgh & Midway Coal Mining Co.	Pageton, W. Va.	120	1
Pocahontas Fuel Co.	Vivian, W. Va.	60	1
Powhattan Coal & Coke Co.	Whitsett, Pa.	400	4
Pulaski Iron Co.	Douglas, Pa.	650	4
Republic Iron & Steel Co.	West Newton, Pa.	400	4
Sagamore Coal Co.	Barton, Mo.	250	..
Standard Coal Co.	Barton, Mo.	125	..
Stith Coal Co.	Freeman, W. Va.	30	1
Strange Coal Co.	Pocahontas, Va.	60	1
Upland Coal & Coke Co.	Powhattan, W. Va.	30	1
Utah Fuel Co.	Eckman, W. Va.	60	1
Wheeling Township Coal Mining Co.	Sayreton, Ala.	300	..
	Sagamore, Tenn.	125	..
	Vincennes, Ind.	500	..
	America, Ala.	200	..
	New Philadelphia, Pa.	35	4
	Elkhorn, W. Va.	60	1
	Castle Gate, Utah	500	..
	Adena, O.	400	..

1 Menzies Hydro-Separators; 2 combination Menzies Hydro-Separator and Arms Tables; 3 American Pneumatic Separators; 4 Rheolaveur System; 5 Arms Tables; 6 Simon-Carves Washer; 7 Chance System.

tons. In this latter figure is included jigs and wet tables.

Gratifying as the record for 1928 has been there is strong reason for believing that the next few years will see still greater progress in top-

works construction of the most modern type. Editorial inquiry in the field has unearthed a mass of data pointing in this direction. More and more operating companies are considering the question.

How Can We Make the Coal Industry More Profitable in 1929?

(Continued from page 24)

industry. The improvement will have to be made up of a better understanding among those in the industry and a closer attention to the small details. Consolidations will greatly help, but we have seen that they come slowly and cannot be depended upon for any immediate help."

Weak Producers Driven Out

Consolidation of the higher-grade properties and discontinuance of ruinous competition and selling below

cost are the hopes for better profits in 1929, according to J. W. Gallo-way, president, Maryland Coal Co. of West Virginia. "Unless something along this line is worked out by the larger and more influential operators and producers, the 'jungle row,' as expressed by our good friend, Mr. Anderson, of the Consolidation Coal Co., will continue," resulting in the gradual elimination of the weaker companies.

"The mining of coal with no mar-

ket is nothing short of a crime, and the bidding for contracts or the taking on of business which does not include a proper depletion and depreciation charge plus profit is worse."

Consolidation, Clean Coal Hold Promise

"Consolidation of companies in the same district, clean coal and adjustment of railroad rates where they are manifestly unfair to the producer of coal are the only remedies that seem to me capable of bringing about the desired result" [more profits in 1929], states S. Pemberton Hutchinson, president Westmoreland Coal Co.

"Consolidation of companies means, in many instances, the closing down of high-cost mines. Just as in other industries, substitutes have been found for coal. In the course of a few years it may be that the needs of the country will demand more coal, but I do not think that we will see that happy condition in 1929."

Regulation by Commission Is Proposed

"To prescribe remedies [for the lack of profits in the coal industry] we must first ascertain remediable causes," states Edgar W. Tait, president, Allegheny River Mining Co. "There may be others, but to my mind there are two principal causes of the industry's ills which are presently remediable."

"One of these causes is the shipping of coal on consignment—the shipment of a few cars of unsold coal to the market—with a consequent depression of the spot price out of all proportion to the amount of coal offered at the buyer's price. I believe this could be prevented by orders of the Interstate Commerce Commission." In past years the Commission has acted to protect the public interest during a shortage of coal and as the solvency of the coal industry is vital to business in general, and therefore to the public interest, this regulation probably could be made without further legislation. This would not be government regulation but the termination of the use of railroad equipment for storage by a private industry.

The second cause and remedy may be stated as follows:

"Regardless of the number of tons mined, every coal producer of any consequence has a certain money outlay for taxes, insurance, workmen's

compensation, salaries of executives and monthly men, depreciation and repairs, legal expense, pumping, ventilation, cleaning up falls of roof in haulageways, maintenance of a sales force, office rent and so on. This we shall call 'indirect cost.'

"The 'direct cost'—the out-of-pocket cost of producing each additional ton of coal—might be, by way of illustration, \$1.30 per ton, and if the operator produced at his utmost capacity, the 'indirect cost'—the 'overhead'—might be another 50c. per ton. The producer knows that whatever he gets above the \$1.30 per ton will help absorb his overhead, so he meets the market, and then cuts his price under the market to try to reach his producing capacity. But, with all the producers doing the same thing, none of them reach their producing capacity, and the market price drops below total cost toward the 'direct cost,' and the final result is a loss for all."

Several remedies might be proposed. Letting down the bars of the Sherman Anti-Trust act, permitting coal operators to agree to maintain a certain fair price, might help if it were not for the fact that the great number of companies would make maintenance of the agreement practically impossible. Government regulation and price fixing would be unconstitutional, contrary to American principles and a precedent for price fixing for all other commodities.

The salvation of the coal business lies in mergers and consolidations, but these cannot come from the unaided efforts of the operators but only through bankers' ownership control. At present many operators are such large borrowers at banks that the banks could control the policies of the companies. It is believed that banks under the law are allowed to form agreements to protect their loans. If banks and financial interests would do this and jointly and concertedly tell their coal-operator borrowers that their loans would no longer be considered liquid unless they sell at a profitable price, much might be accomplished. In addition, the large number of companies owned by banks and financial interests could well join in such a movement.

"In my opinion, seeking for the remedy, the hope lies in the aid of co-ordinated financial power. Individual operating owners, by themselves, will never accomplish worthwhile mergers, and neither will operating executives. By this I do not mean that the assistance of operating

executives will not be necessary. Their help in working out the practical details will be vital. But the motivating impulse for stabilization of price on a reasonable basis and eventual consolidations and mergers must come from banking and financial sources."

Intelligent Marketing Holds Solution

"There arises in my mind," writes W. J. Jenkins, president and general manager, Consolidated Coal Co. of St. Louis, "the question as to whether the year just closed has been a profitable one for the industry. We do know the facts for the year 1927—that 2,665 bituminous coal companies reporting operated at a loss and that their losses exceeded the profits of all the other companies by the sum of \$22,000,000. Tonnage figures for the year 1928 indicate a production of less than 500,000,000, or an annual average reduction of 30,000,000 tons as compared to the previous four years.

"It is my firm conviction that, regardless of the causes bringing about overproduction, *intelligent marketing*, whether called controlled sales or any other name, is the only solution to the inquiry ["How can the coal industry be made more profitable in 1929?"]. Co-operation of both operating and sales departments, along with sane sales policies of individual companies and the discontinuance of consignment coal and sales to individuals or companies not directly interested in the mining and production of coal, together with sensible competition, whether between competing companies or districts, is necessary before the industry can be expected to thrive as it should."

Survival of the Fittest In Coal Business

Guy Darst, president, Benedict Coal Corporation, states that he has "no nostrums to propose for the benefit of the coal industry in 1929. As a gentleman filled with hooch once said, 'It's a case of the surfitest.' Perhaps during the year those who are getting advances on this month's shipments for last month's payrolls and leaving several months' unpaid vouchers in the rear will reach the end of their rope. Then the survivors might make some money in 1930. The concentration of selling into fewer hands would be a constructive move, but on the whole 'there is no balm in Gilead.'"

Injurious Competition Is Condemned

Cut-throat competition is condemned by P. J. Quealy, president and general manager, Kemmerer Coal Co., who states that "the cut-throat policy among operators who sell their coal at less than the cost of production if eliminated and replaced by a demand for a price at least not less than the cost of production would certainly improve the present conditions if observed by all operators. Operators having more favorable conditions should maintain a price that would enable the average mine also to operate."

Solution Lies in Fair Prices

Fair prices are the solution of the profits problem in 1929 in the estimation of J. W. Searles, president, Pennsylvania Coal & Coke Corporation, who writes that they can be obtained by "a sincere and sustained effort on the part of the producers to realize prices for coal which will insure a fair return on the investment."

Better Demand Required

Arthur B. Stewart, president, Davis Coal & Coke Co., hesitates to add any suggestions to the many already made on how to increase profits in the coal industry. However, in his opinion, "it is pretty hard to beat old John Stuart Mill on demand and supply. If somebody could bring about a greater demand, there is no question but that the industry would be in better shape. I feel that, as some others have said, we are the victims of an under-demand, brought about by conservation."

Limited Output Suggested

"The only effectual manner in which the industry can be put on a profitable basis," in the opinion of Chas. F. DeBardeleben, president, Alabama Fuel & Iron Co., "is to limit production, which is now largely in excess of demand. I have adopted this policy as far as our company is concerned, and as a result have closed three mines and will not accept business below cost of production."

Eliminate Distress Coal

"Some improvement might be shown," writes P. M. Snyder, president C. C. B. Smokeless Coal Co., "if all producers would confine their shipments to bona-fide orders and keep free or distressed coal off the market."

Bituminous Coal Mines Spend More Than \$140,000,000 for Material and Supplies in 1928

BITUMINOUS coal operations in the United States spent over \$140,000,000 for materials and supplies needed to run the mines of the country in 1928. This figure excludes all charges to capital accounts as well as payments for purchased power.

Data available indicate that if these expenditures and wages and salaries and goods purchased for resale through company stores were included, the buying power of the soft-coal industry last year—measured by the amount of money the industry put into circulation—exceeded a billion dollars.

The estimate for the total spent for materials and supplies is based upon figures collected by *Coal Age* late last month and early this month from operating companies representing over 17.6 per cent of the total bituminous tonnage mined last year. Returns were received from all but seven of the bituminous coal states.

These returns accounted for 87,148,162 net tons and yielded a weighted average expenditure per ton for material and supplies for the country as a whole of 28.5c. In arriving at this figure totals for each state were weighted separately on the basis of actual reports from that state and the estimated output for the state during the past year. Using the estimate of 492,755,000 tons for the production in 1928, this weighting gave \$140,126,350 as the total for materials and supplies.

Of the returns received which gave data with sufficient detail to make the figures reported available for inclusion in the general compilations, 9.10 per cent of the returns were from companies producing 25,000 tons or less last year, 28.48 per cent from companies producing between 25,001 and 100,000 tons; 15.15 per cent from companies producing between 100,001 and 200,000 tons;

11.51 per cent from companies producing between 200,001 and 300,000 tons; 10.30 per cent from companies producing between 300,001 and 400,000 tons; 4.85 per cent from companies producing between 400,001 and 500,000 tons; 9.09 per cent from companies producing between 500,001 and 1,000,000 tons; 6.67 per cent from companies producing between 1,000,001 and 2,500,000 tons and 4.85 per cent from companies producing in excess of 2,500,000 tons.

In canvassing the field an effort was made to find out particularly what the commercial operations which have been bearing the brunt of competitive selling in recent years were spending. For this reason most of the large captive mines were deliberately excluded from the survey, but a number of consumer-owned properties were included in order to compare expenditures and to make the final figures fairly representative of the whole situation.

The final figures check closely with the government canvass made in the 1919 census. Census Bureau figures for that year show a total expenditure for material and supplies of \$142,432,551. The output that year was 465,860,058 net tons, making the average expenditure per ton 30.5c. During that same year the bituminous mines spent \$11,280,509 for purchased power; salaried officers, superintendents and technical employees received \$50,334,218; clerical help and subordinate salaried officials, \$18,834,820, and wage-earners, \$682,601,068. Fuels costs, royalties and rentals, taxes and contract work that year brought the total major operating expenses to \$990,738,244.

Details of estimated expenditures for materials and supplies last year, based upon the *Coal Age* survey, and actual expenditures in 1919, as shown in the Census Bureau report, are set out in the table following:

Expenditures for Materials and Supplies by Bituminous Coal Mines

State	1928 Estimated Expenditures for Materials and Supplies			1919 Actual Expenditures for Materials and Supplies		
	Estimated Production Net Tons	Average Per Ton,* Cents	Total for State**	Actual Production Net Tons	Average Per Ton, Cents	Total for State
Alabama.....	16,657,000	43.0	\$7,140,000	15,536,721	35.0	\$5,420,177
Arkansas.....	†	†	†	1,429,020	50.0	716,615
Colorado.....	9,862,000	42.0	4,358,000	10,323,420	30.0	3,052,028
Illinois.....	53,124,000	17.5	9,290,000	60,862,608	25.0	15,345,498
Indiana.....	15,576,000	17.0	2,648,000	20,912,288	26.0	5,379,400
Iowa.....	3,091,000	25.0	772,750	5,624,692	31.0	1,758,025
Kansas.....	2,084,000	21.0	437,000	5,224,724	36.0	1,906,063
Kentucky.....	64,498,000	32.5	20,980,000	30,036,061	36.0	10,944,940
Maryland.....	†	†	†	3,021,686	31.0	929,325
Michigan.....	†	†	†	996,545	66.0	664,557
Missouri.....	3,496,000	19.0	664,000	3,979,798	35.0	1,381,223
Montana.....	3,111,000	21.5	669,000	3,236,369	37.0	1,183,810
New Mexico.....	2,924,000	41.0	1,199,000	3,138,756	31.0	975,742
North Dakota.....	1,737,000	20.0	345,400	840,959	34.0	283,633
Ohio.....	†	†	†	35,876,682	25.0	9,105,833
Oklahoma.....	†	†	†	3,802,113	37.0	1,391,771
Pennsylvania.....	124,584,000	39.5	49,200,000	150,758,154	30.0	44,912,367
Tennessee.....	†	†	†	5,213,205	40.0	2,036,127
Texas.....	891,000	20.0	178,200	1,680,656	23.0	387,935
Utah.....	4,773,000	42.0	2,004,000	4,631,323	34.0	1,564,955
Virginia.....	12,415,000	18.0	2,233,000	9,326,830	37.0	3,432,448
Washington.....	†	†	†	2,990,447	46.0	1,376,254
West Virginia.....	136,943,000	19.0	26,030,000	79,036,553	33.0	25,983,284
Wyoming.....	6,527,000	20.5	1,343,000	7,219,738	32.0	2,287,971

Totals for United States.. \$492,755,000 28.5 \$140,126,350 465,860,058 30.5 \$142,432,551

*Averages derived from actual figures submitted *Coal Age* by operators.

**Estimated tonnage multiplied by average expenditure per ton.

†Included in totals for United States.

‡Including other coal-producing states not specifically shown.

OPERATING IDEAS from Production, Electrical and Mechanical Men

Resistance of High-Speed Breaker Stops Converter Flashing

AN INHERENT disadvantage of a synchronous converter is that a short-circuit on the d.-c. feeder close to the machine terminals causes severe sparking or flashing at the brushes when the current is interrupted by the ordinary breaker. If the d.-c. short-circuit current jumps to several times full load, the breaker must operate with sufficient speed to interrupt the current within about one-sixtieth of a second, before the a.-c. current has time to reach maximum value, if flashing is to be avoided.

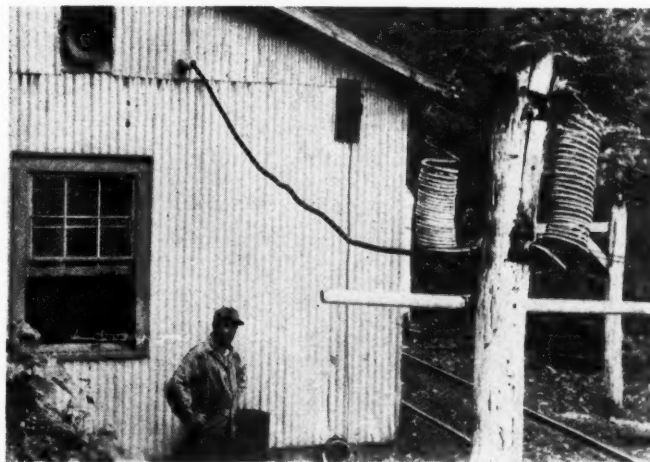
Even if the breaker is not of the high-speed type, short-circuits distant from the machine are not likely to cause flashing. The critical distance, of course, depends upon the line resistance. When a substation is located close to the haulage track and the connection from the converter to the trolley wire is but a few feet long the effect of distance can be obtained by inserting resistance in the connection.

The accompanying photograph shows a resistance in series with the main d.-c. feeder of the 250-volt substation at the Logan-Chilton Coal Co., Rita, Logan County, W. Va. E. B. Gibson, superintendent, who in the photograph is standing beside the substation, is positive that the resistance has been responsible for elimination of flashing on the two 150-kw. synchronous converters.

Two coils of 4/0 copper wire, connected in parallel, form the resistance. Each has 25 turns and is 8 in. in diameter. This provides but 0.0013 ohm, which amount, according to theory, appears to be too small, but the practicability, of course, depends to a great extent upon the ability of the machine to withstand high currents without flashing, and upon the distance from the substation that the short-circuits have occurred.

Technical advice probably would specify around 0.04 ohm for protection against the short-circuits that might occur on the haulway within a few feet of the feeder connection. This amount, however, would have the disadvantage that it would cause an additional drop of 20 volts at full load for one machine and would cause an energy waste amounting to 50c. to \$1 per day while in operation.

Referring again to the photograph, at the upper left is the horn of an electric siren that is sounded automatically when either of the non-reclosing generator breakers opens. Mr. Gibson states that this siren has cut the d.-c. power delays to a minimum. He can hear it from his office, several hundred feet distant, and can tell exactly how long it takes the shop or tippie man to step into the substation and close or attempt to close the breaker.

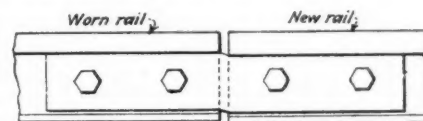


Resistance Coils in
Feeder to Trolley
Wire



Use of Upset Fishplates Insures Smooth Track

New rails often are laid next to old when repairing mine track and result in a high joint. The subsequent jolting action causes an appreciable loss of coal from the mine cars, according to H. A. Brosch, Windber, Pa.



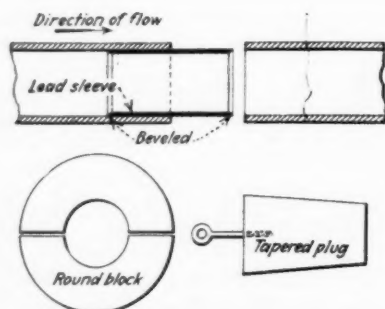
No Jolting on This Joint

To avoid jolting and insure smooth running, a special fishplate is used in coupling rails on which the ball has been worn down to new rails. It is made by upsetting a pair of fishplates, which can easily be done in any shop.

Lead Sleeves Forestall Pipe Corrosion

Corrosion of pipe lines by acid water may be forestalled by coating the inside of the pipe with portland cement, according to W. E. Warner, Brentford, England. Plain iron pipes are coated by making up a very thin cement mixture and allowing it to pass through each length of pipe on an incline. Three coats are put on, a few hours being allowed to elapse after each one. The pipe is given half a turn after each application.

Where it is necessary to protect the joints in iron pipe a lead sleeve may be placed inside and expanded. This sleeve is about 6 in. long and fits closely to the inside of the pipe. The ends are beveled to decrease the resistance to flow. The end of the sleeve presented to the flow is expanded to fit the pipe by driving a round tapered plug into a round block of wood which fits inside the sleeve.



Details of Corrosion Resisting Joint

As the round block is sawed across, the driving in of the tapered plug expands it and the sleeve. Removal of the tapered plug allows the block to collapse and it can be easily withdrawn. The next joint of pipe is then fitted on and drawn up with bolts. No opportunity is presented to expand this end of the sleeve but red lead is used to make a tight joint.

Hints on Rail Bond Maintenance

No one would think of buying an automobile, filling it with gasoline, oil and water, and then presuming that everything was all set to drive the car its entire life without any further attention. However, this method is often indirectly in use in connection with rail bonding in the mining industry, according to F. F. Smith, engineering department, Ohio Brass Co., Mansfield, Ohio.

The same reasons which led to the initial investment in rail bonds and equipment leads to the inevitable conclusion that it is distinctly worth while to maintain the bonding in its original state of high efficiency. One might presume that once a bond was properly applied nothing could or would happen to alter its efficient state. However, when it is considered that bonds can and do become defective from various causes, such as improper initial installation or strands cut by wheel flanges when derailments occur, mutilated by dragging equipment or cut or torn loose by track men when repairing the track, it is at once appreciated that bonds do require attention, inspection and maintenance.

The type of bond selected for bonding mine tracks determines to a reasonable degree the ease or difficulty experienced in maintaining the bonding. For instance, a bond welded to the head of light rail is out of the question because of its likelihood of being cut off by the false flanges which form on locomotive tires. Bonds which are applied to the base of the rail are in general use, and, when installed on the inside of the rail, are not likely to be cut off by the flanges on the wheels in case of derailment.

Bonds should be of sufficient size to carry the load without undue loss of power in the return circuit. Cross-bonds also should be installed to insure

against power loss resulting from a damaged joint bond. The spacing of cross-bonds varies from 150 ft. to as high as 300 ft. However, best practice indicates that 200 ft. should be the maximum distance. Cross-bonds should be installed at definite intervals, which in turn will aid the inspector in checking up on the cross-bonding as he will then know just where to look for such a bond. In addition, cross-bonds should be equal in size to the joint bonds because in case of a joint-bond failure the cross-bond must carry the current and therefore should not be of smaller capacity.

To insure continuous good performance of bonds periodic inspection has

Don't Let Ideas Go to Seed

That new mechanical kink, electrical problem or short cut you may have worked out in your job probably is worth money—\$5 or more paid for worth-while ideas published in these pages. Send it in before someone else thinks of it. Photographs and sketches help to make it more striking.

been found profitable. This may be a visual inspection about every month to find loose and mutilated bonds. The inspectors should be on the lookout for bonds whose strands are cut. Hitting the terminal a few hammer blows will disclose any loose terminals, and such bonds should be marked and replaced as soon as practicable.

At least once a year, or every six months, if possible, each bond should be tested by a duplex millivolt meter. Every bond has its equivalent rail resistance and this is found by testing with a duplex millivolt meter, one scale reading the drop across the terminals.

This reading is balanced by moving the third contact on the rail until an equal reading is obtained on the second scale. The number of feet of equivalent resistance, of course, will vary with size and length of bond and also with the weight of the rail. Bonds should have their predetermined resistance charted, and when a bond exceeds this resistance it should be replaced with a new bond.

The locations of bonds to be replaced can be indicated by a chalk mark on the rib or the roof and replacement can be made by the bonding crew as soon as convenient on their regular maintenance schedule.

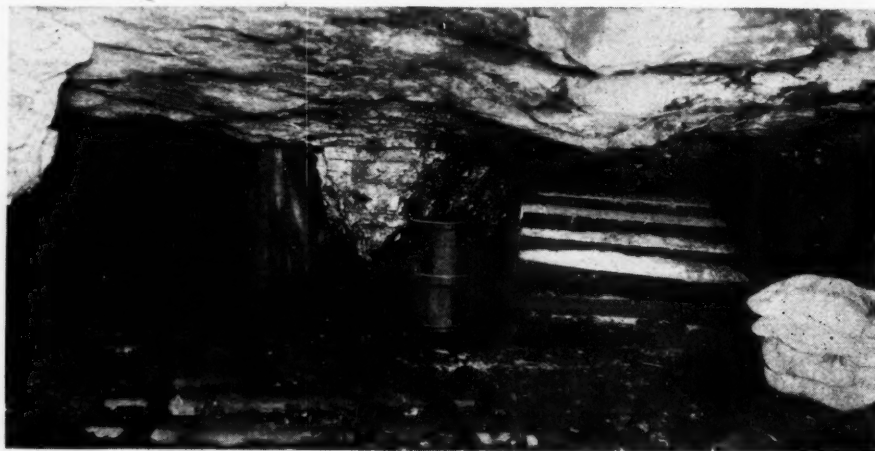
Where such a program of bond inspection and maintenance is initiated and carefully carried out the return circuit will always be at its highest efficiency. The loss of power due to poorly maintained bonding will be minimized. This attention to the bonding of track will lower the cost of power per ton of coal mined and is a distinctly worth-while procedure.

Bags of Rock Dust Kept Close to the Face

Efficiency of rock dust as an agent for smothering fire in mines has been demonstrated several times in actual emergency service. Rock dust stored in barriers serves as a supply for fire fighting, but entire dependence on the regular barriers as the source has certain disadvantages. It is important that rock dust be stored closer to the working face and that some means be available so that one man can carry 50 lb. or more of the dust at a load.

The accompanying photograph, made in the North Diamond mine of the West Kentucky Coal Co., shows, at the extreme right, four 100-lb. bags of rock dust stored on a 2x10 plank near a point where a panel entry turns off of the main. This supply is for protection at the head of the entry, which in this case is less than 200 ft. from the bags. As the entry driving progresses the four

Water Barrel, Barrier and Bags of Rock Dust



bags of dust are moved up to within three crosscuts, or about 150 ft. of the face.

Two other safety precautions are evident in the photograph. In the center is a water barrel as fire protection for the curtain at the left. Between the barrel and the pile of bags is a rock-dust barrier. Formerly the barriers were built with all troughs at the same elevation and close to the top, but that arrangement was troublesome because men walked under the troughs and sometimes tripped them, dumping the contents.

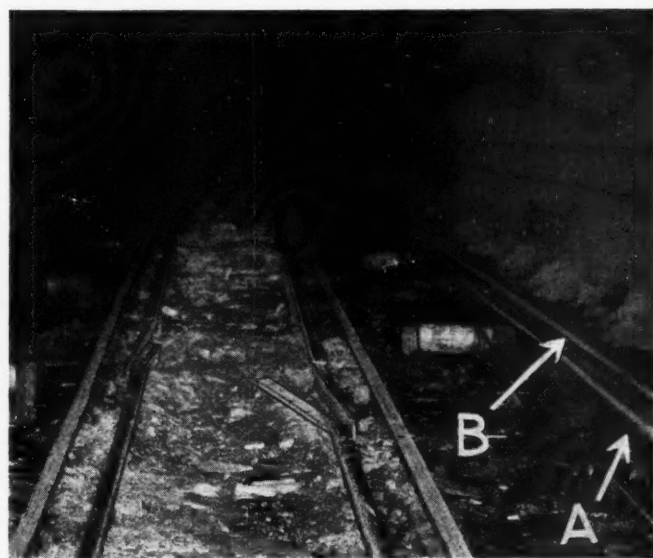
Best Runaway Protection Requires Extra Rails

Protection against runaways on a slope is not needed as frequently when lowering empties as it is when hoisting loads. A defective rope or car hitching is most likely to fail during hoisting and, fortunately, it is much easier to provide protection for that direction of travel.

The most common method is to attach a drag to the last car, but this practice is objectionable because of the hammering of the drag against the rollers. A better method is to install a double set of rails and put spring derails in one of the rails over which the ascending trip travels.

Such an installation is shown in the accompanying photograph of the double-tracked main slope at Bessie mine of the Sloss-Sheffield Steel & Iron Co., Maben, Ala. Referring to the right-hand track, the loads are hoisted over rails "A" and the empties lowered over rails "B."

In the two rails closest to the center of the slope, spring derails are installed every rail length apart. If a car or whole trip that is being hoisted breaks loose at any point along the slope it will be derailed before it can travel more than 30 ft.



Looking
Down
the Slope

Preservative Treatment of Mine Timber Is a Profitable Investment

THE coal mining industry has been accused of committing many sins, according to W. G. Atwood, of New York City, consulting engineer for the Norfolk Creosoting Co., Norfolk, Va., but no accusation is better justified than the one making this industry responsible for a greater preventable waste of timber than any other timber-using industry.

Many mine operators have been deceived as to the economy of timber preservation because they saw only the low cost of low-grade timber, obtained locally, and did not realize the annual cost of using such material. The railroads have studied this question for many years and as a result have become the largest consumers of treated timber in the United States. They generally use a better grade of timber than the mines but the life of it is much longer, so that the savings resulting from treatment of the different grades are comparable.

Another reason for lack of interest by mine operators in the preservation of timber is that coal-tar creosote is the best known and most generally used preservative and is entirely satisfactory for most railroad uses. However, there is a more or less justified prejudice against the use of creosote underground on account of its odor, the fact that timbermen object to handling it and because of dense smoke in case of fire.

There also is a generally incorrect idea as to the proportion of timber which fails as the result of pressure. If careful studies are made it usually will be found that the proportion of sound timber which fails on account of pressure is much smaller than is generally supposed. Much of the timber said to fail from this cause is materially weakened by decay before failure takes place. It also is true that it is

not economical to treat all timber because the required life in many locations is too short to justify the expenditure. A careful survey by someone with experience is necessary to determine just what timber should be treated, as this proportion will vary greatly with local conditions.

Several studies of timber life have been made recently. The Bureau of Mines and the Forest Service have published a joint report and the Carnegie Institute of Technology recently completed and published the results of a comprehensive study.



Solid Treated Timber and Decaying
Untreated Posts

Several of the anthracite companies have made surveys of their own conditions, and the results of all these studies are in surprising agreement. Practically all these reports show a minimum life for gangway and airway timber of six months and an average life varying from 2.8 years to 5.2 years, the latter being the estimate a large anthracite company which made the survey without experienced assistance. This average probably is too high.

The average cost of green, unpeeled and framed gangway timber was found by one anthracite company to be \$7.79, the cost of the original construction was \$7.50 and the cost of replacing \$10 per set, making the total cost of new construction \$15.29 and replacements \$17.79. This same company found the cost of timber treated with 0.8 lb. of zinc chloride per cubic foot to be \$12.06 per set, and with a 6 per cent solution of Ac-Zol treated to refusal to be \$16.49 per set.

Assuming the worst conditions (six months life for untreated timber) the



cost per set for three years would show a saving, assuming a life of 3 years for zinc chloride treatment, and disregarding interest, of \$102.47, at which time the untreated set would still have 6 months life and the zinc treated set still more.

If Ac-Zol were used in an average case with a life of three years for untreated timber and a life of 21 years for the treated timber the results would be as follows:

Comparative Cost, Untreated and Zinc Chloride Treated Timber

Untreated	
First installation.....	\$15.29
Six replacements.....	106.74
Total cost, 3 years.....	\$122.03
Annual cost.....	40.68
Treated	
Installation zinc chloride.....	\$19.56
Total cost, 3 years.....	\$19.56
Annual cost.....	6.52

Comparative Cost, Untreated and Ac-Zol Treated Timber

Untreated	
First installation.....	\$15.29
Six replacements.....	106.74
Interest compounded annually.....	115.69
Total cost.....	\$237.72
Annual cost.....	11.32
Treated	
Ac-Zol treated.....	\$23.99
Interest.....	57.58
Total cost.....	\$81.57
Annual cost.....	3.88

Zinc chloride is a water soluble salt and consequently not so durable as an insoluble preservative. It has been in constant use for many years for wood preservation and its characteristics and service are well known. Ac-Zol is a practically insoluble salt treatment with a service record of about fifteen years. It appears to have a preservative value closely approaching that of creosote. Neither of these preservatives is in any way objectionable for use underground though timber treated with them should be air seasoned for a short time after treatment. Zinc chloride is very slightly fire retardant while Ac-Zol is considerably so. With either of them in use there would be much less decayed and easily ignited wood in the

Treated and Untreated (Broken) Timber After One Year

mine than if untreated timber were used.

The treatment of mine ties where mechanical haulage is in use also would show a saving. The railroad records here reveal clearly what can be accomplished; the following figures are quoted from the reports of the American Railway Engineering Association:

Replacements of Treated Railroad Ties

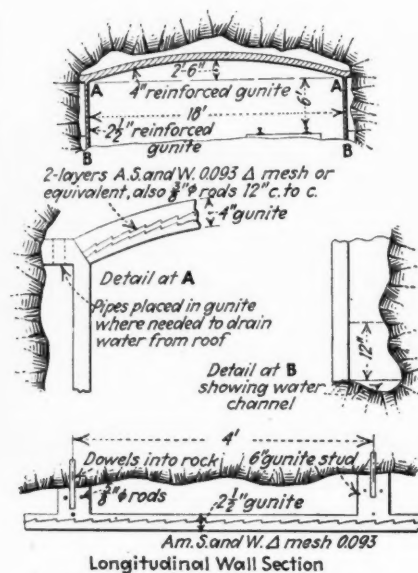
Railroad	Year Extensive Use Treated Ties Begun	Ties Replaced Per Mile Av. 5 Yrs.	Ties Replaced Per Mile, 1924
A.T. & S.F.....	1900	229	115
B. & O.....	1910	249	192
C. & E.I.....	1900	227	92
C.C.C. & St.L.	1905	307	139
D.L. & W.....	1910	229	85
N.Y.C. - West	1910	257	129

On account of the relatively shorter life of timber underground a much greater saving would be obtained from the use of treated mine ties. In times of depression like the present the use of treated timber would show its greatest saving because of the reduction in timber maintenance costs when production is low.

Guniting Haulage Slope Keeps Out Water

A water seepage amounting to approximately 1,000 g.p.m. in the haulage slope of the Yukon mine of the Crown Coal Co., Arnettsville, W. Va., was

Light and Dry



stopped entirely by lining the opening with Gunite.

A reinforced arch and side walls were built up according to the sketch, thus forcing the water down the sides behind the walls and entirely drying the haulage way. This work was done by the contract department of the Cement-Gun Co., Inc., Allentown, Pa. The accompanying illustration shows the appearance of the slope after the job was completed.

Hints on Cleaning of Electric Motors

About once a year, or oftener if conditions warrant, motors should be overhauled, declares C. W. Falls, industrial engineering department, General Electric Co. Smaller motors the windings of which are not particularly accessible should be taken apart.

First, the heavy dirt and grease should be removed with a heavy, stiff brush, wooden or fiber scrapers, and cloths. Rifle-cleaning bristle brushes can be used in the air ducts. Dry dust and dirt may be blown off, using dry compressed air of 25 to 30-lb. pressure, taking care to blow the dirt out from the winding. If the dirt and dust is metallic, conducting or abrasive, air pressure may drive the material into the insulation and damage it. Hence, for such conditions, pressure is not so satisfactory as a suction system. If compressed air at low pressure is used, care must be taken to properly direct it so that the dust will not cause damage and will not be pocketed in the various corners.

Grease, oil and sticky dirt are easily removed by applying cleaning liquids like carbon tetrachloride (Pyrene, Carbona), gasoline or naphtha. All of these liquids evaporate quickly and, if not applied too generously, will not soak or injure the insulation. Carbon tetra-

chloride is best and is recommended because it is non-inflammable.

In case one of the other liquids must be used it should be applied out of doors or in a well-ventilated room. It must be remembered that gasoline or naphtha vapor is heavier than air and will flow into pits and basements, and may remain there for hours or even days. The casual smoker, a spark from a hammer or chisel, or even from a shoe nail may cause a serious explosion. Therefore proper ventilation of the room is essential and may require specially piped ventilating fans. In using carbon tetrachloride the explosion hazard is eliminated, but some ventilation is required to remove the vapor, which might affect the safety and comfort of the workmen.

There are several good methods of applying the cleansing liquid. A cloth saturated in the liquid may be used to wipe the coils. A paint brush dipped in carbon tetrachloride is handy to get into corners and crevices and between small coils. Care should be taken not to soak the insulation, as would be the case if coils or small machines were dipped into the liquid.

Probably the best method of applying the liquid is to spray it on. A spray gun, paint spraying appliance or an ordinary blow torch are often used with good results, although the latter device is likely to give too heavy a spray.

An atomizer will give excellent results, using a pressure of about 80 lb. if the insulation is in good condition, or 40 to 50 lb. if the insulation is old. The atomizer should be held not more than 5 or 6 in. away from the coils.

While the insulation will dry quickly at ordinary room temperature, after such cleaning methods it is highly desirable to heat it to drive off all moisture before applying varnish.

If the motor can be spared from service long enough, the insulation should be dried out by heating to from 90 to 100 deg. C. While warm, a high-grade insulating varnish should be applied. For severe acid, alkali or moisture conditions a black plastic baking varnish is best, while for conditions where oil or dusts are present a clear or yellow varnish should be used.

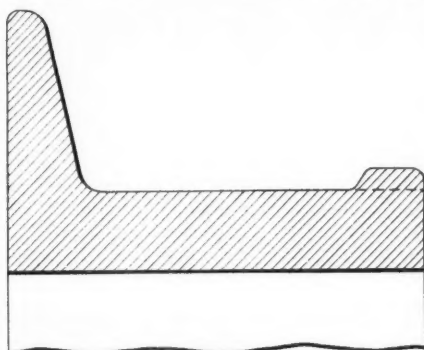
The varnish may be sprayed or brushed on. For small stators or rotors it is best to dip the windings into the varnish, cleaning off the adjacent metal parts afterward by using a solvent of the varnish. After applying the varnish the best results are obtained by baking for 6 to 7 hours at about 100 deg. C. Experience with particular conditions of operation or the condition of the insulation may indicate the desirability of applying a second coat of the same varnish, followed again by 6 to 7 hours of baking at 100 deg. C.

If the machine must be put back in service quickly or if facilities are not available for baking, fairly good results will be obtained by applying one of the quick-drying black or clear varnishes.

Acetylene Cutting Torch Smooths Worn Tires

In search of a method of turning down worn locomotive tires without removing the tire or truck, Van B. Stith, superintendent, Green River Fuel Co., Mogg, Ky., found an acetylene cutting torch readily adaptable. The contour of the worn tires was as shown in the sketch. The first step in smoothing the tire consists in making a template in the form of a half circle of $\frac{1}{4}$ x 1-in. iron, the template having the same curvature as the wheel.

The template is then clamped to the outside of the wheel by two "C" clamps



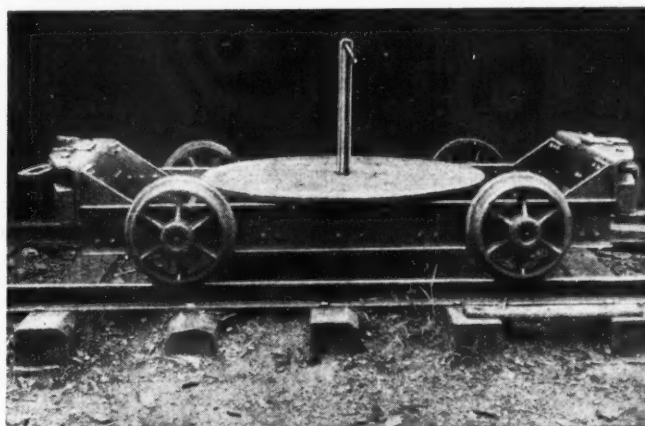
Section of Worn Tire; Metal Removed Along Dotted Line

as a guide for the torch and the excess metal cut away as shown by the dotted line in the sketch. After removal of the metal "Feralun" brake shoes are applied to smooth up the surface. Two hours is required to cut down four tires 28 in. in diameter.

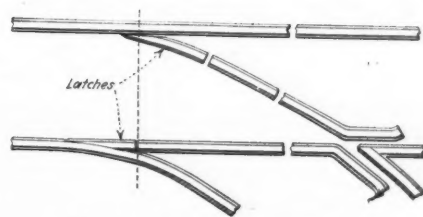
Switch Construction Reduces Hazard

Room turnouts so constructed that the bridle bars, which are the cause of many accidents, are eliminated are described by W. H. Luxton, Linton, Ind. These switches also are less likely to become filled with coal and refuse and should cost less to keep clean.

The switch construction is shown in



Transports and Unrolls Wire



Eliminates Accident Possibility

the accompanying illustration. It will be noticed that the latch on the straight filler rail is set behind, and that on the crooked filler rail is permanently fastened in an open position. Switching is performed by moving the loose latch and leading the cars in by hand. No attention is required for cars being hauled out of a room.

Truck Obviates Dragging Wire Into Mine

Stringing trolley wire in a mine which is not high enough to conveniently accommodate transportation and handling of a reel in the upright position usually is done by cutting off a length of wire and dragging it into the mine. This has several disadvantages compared with taking the reel into the mine on the special truck shown in the accompanying photograph.

J. J. Fluck, superintendent of the Dehue mine of the Youngstown Sheet & Tube Co., in Logan County, West Virginia, had this truck made to his specifications. The center pin is removable to facilitate loading and unloading of the reel. The table is 4 ft. in diameter.

The advantages of the truck are evident. The reel lies flat and is carried low; thus the height is kept to a minimum. The wire is transported at locomotive speed to the section of the mine where it is to be installed, and there is no handling of the reel before or as the wire is unrolled.

Grooved trolley wire of 6/0 size is now used on all main haulage roads in the Dehue mine. With the special truck this heavier and stiffer wire is handled with less trouble than smaller wire by the old method.

The BOSSES Talk It Over



Picking Up the Power Losses

DUCKING through a breakthrough on his morning round, Mac came upon an interested group consisting of the Old Man, Jim and Shorty. The object of interest was a gathering locomotive, which under the tender care of a sweating motorman, was trying to push a couple of loaded cars up a short but steep grade. Due to the presence of the Old Man, the motorman was exercising really remarkable restraint in his language, but occasional echoes of profanity came back from the brakeman ahead. A running start was out of the question because of a curve in the wrong place and the motor was doing its best, which wasn't enough to spin the wheels. Meanwhile the circuit breaker went out every time the controller was run around the last notch.

"Say Jack," said Shorty, "don't use so much sand. You're ruining your return and it don't look like you have any too much juice anyway."

"I'll say I haven't," replied the motorman, stopping long enough to grab a few breaths. "Boy, feel that motor. You could fry an egg on it. I guess I'll have to switch one of these cars into a room."

"It certainly looks as if that motor ought

to shove those cars," the Old Man remarked. "That hill doesn't look as steep as all that. There must be something wrong with the motor."

"Not on your life!" Shorty always rose to defend anything connected with the machinery under his care. "You can't expect a machine to work without juice and I'll bet there aint a feeder line within half a mile of here. Lot's of things raise the devil with a motorman besides his machine. No bonds in the track or bonds that don't make good contact or bad splices in the trolley wire might do it. Maybe the motorman uses too much sand. Every one of these things will cut down the voltage and cause you to lose power. And low voltage means burned-out armatures, too."

"Huh," said the Old Man; "if it isn't one thing around a coal mine, it's three. But now that we all know about it, it's time to do something. Mac, I think it would be a good idea for you and Shorty to check up on all this and see what you can do. And after that, maybe we can give our motormen and machine runners a little instruction in how to operate a machine without burning it up."

WHAT DO YOU THINK?

1. *Will an efficient electrical distribution system reduce mine-power costs?*
2. *Do you believe in regular inspection of the distribution system?*
3. *What system do you use to insure good return and well-built trolley and feeder installations?*
4. *Can men be trained to operate machines so as to reduce power consumption and keep them out of the repair shop?*

All foremen, superintendents, electrical and mechanical men are urged to discuss these questions.
Acceptable letters will be paid for

Supply Deliveries Absorb Bosses

Simplicity in Delivery System Works Best and Is Economical

ONE of the most important though oftentimes most neglected systems in coal mines is the ordering of supplies for mine distribution. If the larger operator could only be brought to realize it, a good arrangement for handling smaller materials is through the medium of an underground storeroom where a stock of commonly used supplies may be kept and drawn upon through regular requisition, as needed. The systems used in ordering supplies should vary with the conditions encountered and the nature of supplies required, with first thought always to simplicity and economy in determining needs and accuracy as to quantities and delivery locations.

Except in emergencies, all orders for electrical and mechanical parts for the following day's needs should be handled and checked each day by the head mechanic or electrician and turned over to the material and stores clerk at the end of each shift. It then becomes the duty of the material and supply man to see that delivery markings or labels are affixed to the different materials for proper delivery. This same procedure should be followed in the ordering of rails, timbers, spikes and other mining supplies, with the single difference that such orders be handed the shift bosses or made up by them and in turn checked by the mine foreman or other person in authority. Timbers, lumber, rails and other bulky materials should be delivered during slow periods of the day and needs anticipated where possible.

In the case of a night force, reports of the delivery of supplies should be made to the material and supply man by the duly authorized persons in charge of such work and care taken to avoid duplication of orders by the day force. Proper supervision of any work is essential to a large degree, but more especially in coal mining.

The responsibility for the proper completion of any underground work by any force of men must be placed upon the shoulders of some single person and though the appointment of a night shift boss usually is the proper procedure, should the force be too small to warrant such expenditure, one member of the night force should be designated to assume full responsibility for the acts and accomplishments of his fellow workers.

Although there are occasions when overtime becomes necessary, the practice is more often abused and when carried on for any length of time should be thoroughly investigated. It sometimes becomes necessary for the night forces to work overtime in order to properly prepare for the day crews, but this is unnecessary where proper supervision is maintained. The work can be planned

or additional men added, as the case may be, and the overtime nightmare eliminated altogether. Care should be taken by both day and night forces to leave their work in good shape so that the next crew may start in without preliminaries and undue loss of time. Neglect in this particular will often occasion overtime at the end of a shift.

J. F. MUSGROVE,
Vice-President and
General Manager,
Frontier Coal Co.

Denver, Colo.

Electricians— Attention!

Does the average mine locomotive get a fair chance? Does it get nearly as much attention to see that it is in good condition as the family flivver gets?

Scan the questions on the opposite page and tell us what you think. Letters accepted and published are paid for.

Controls Night Deliveries By Careful Checking System

THERE always are two ways to do anything and the most accurate always is the cheapest. The mines I have charge of are so checked that I know how everything is before the men go in each morning. I always use the following system for delivering any supplies: If delivered on the night shift, I have each cut boss make out a report of any supplies needed, then I make a report for the night boss, keeping a carbon copy for myself and a copy for the supply motorman.

The report shows supplies wanted at the nearest point, and then shows requirements consecutively by localities. The motorman is required to leave a report stating what supplies he took to each place and the time required on each job. This report is checked with the report I gave him the evening before. The night boss also makes a report showing the job each man worked at and the time required on each job. The firebosses report any wires down or slate falls. The machine men always report any places not cut, and why.

This system requires a little more work on the part of the mine boss but it also eliminates a lot of worry and uncertainty as to what becomes of supplies. By this method it is easy to get the supplies to the proper places.

Kimball, W. Va.

C. E. LIVELY.

Must Note Orders and Placing For Effective Delivery System

A COMPREHENSIVE report system should be adopted for the night shift as well as the day shift, tabulation being made of supplies ordered as well as one of supplies delivered. By this means a record is kept of supplies used in different parts of the mine. Time required and delays in delivery to different sections also should be noted, making it easy to check up on the causes of delay in night delivery. From this an economical system can be evolved to suit conditions in various parts of the mine.

When a miner or assistant boss orders supplies for the next day's work and delivery is made to the wrong place this not only increases delivery expense but may be the cause of accidents because of the lack of needed material or the stuff being a hazard in the wrong place.

An effective system is to have the assistant foreman order supplies, giving his report to the night boss—or the supply boss, if the night boss has more than he can look after personally. The assistant boss should note on his report whether the supplies are needed immediately or not, which will give leeway in making deliveries and preventing overtime. At the end of the night the supply crew should make a report to the night boss showing what was delivered and where, as well as a notation of delays, breakdowns, etc.

H. T. WALTON.

Wheelwright, Ky.

Day Delivery Conserves Time And Cuts Stock of Supplies

CONTROLLING delivery of supplies to the inside of a mine is a subject that interests me, for about six years ago I took charge of a mine in which the supplies were being delivered at night. A gang of six men "worked" all night, and there was constant complaint of failure to deliver supplies at the right time to the right place. The expense was entirely too heavy for the results attained, a proper inventory could not be kept and an unreasonable amount of material had to be carried.

We changed the delivery and all loading to the day shift, under the direct supervision of the stock man. We immediately began to get better results all along the line and ultimately cut the inventory of supplies of all kinds by two-thirds.

The reason for this improvement seemed to be better supervision and coordination, but probably just as vital a reason was that by sending the supplies in during the day shift a systematic,

natural routing could be maintained—the supplies took their places in the current of traffic and if placed in the proper trip and in the proper place in the trip they almost automatically arrived at the desired place. At night we found that almost every sidetrack would be occupied by the leftovers of either empties or loads; the supply men had to shift around these standing cars in order to get to the faces.

Certainly if a night crew is employed to deliver supplies they should be required to submit delivery reports, but the foreman also should be required to submit definite, written requisitions. The question of how to apportion the work of the night crew to avoid overtime simply cannot be answered intelligently except for some specific case in which all the factors are known.

We gave each foreman a good leather folder, small enough to be carried in an ordinary vest pocket. To this was fitted a removable pad, perforated so that the leaves could be torn out, each foreman's pad being of a different color so that his orders could be easily recognized and sorted out. Absolutely no verbal orders were accepted unless an emergency existed; but in case a verbal order was filled the stock man made it a point to get a written order before that foreman went home. In case this point was neglected, if the neglect was too flagrant it showed up at inventory time.

By this method we cut supplies of all kinds from some \$40,000 worth in stock to about \$12,000 in the course of two or three years. When it was working right the physical inventory, taken every six months, usually checked within \$300 of the book inventory, which we considered good. A negligent stock man in one six months' period failed to check by about \$5,000, so first get a good stock man.

E. C. TAYLOR,
General Manager,
Guyan Collieries Corporation.
Tamclif, W. Va.

Co-operation Is Requirement For Success of Any System

IN CONSIDERING the control of night delivery of supplies one is inclined to wonder if Mac is giving the co-operation necessary toward this important work. His efforts at co-ordination seems to be of the most haphazard nature, with the result that the night force has been content to leave their work in a chaotic condition. Fortunately, there are not many of his kind.

All supplies should be delivered under the direct supervision of a competent and aggressive foreman who will not tolerate careless delivery, but, unless this foreman has a complete daily list of the supplies required in the mine the night force is an unnecessary extravagance. It is a well-known fact that an overwhelming amount of overhead can be charged either to lack of vision or

cheese-paring methods on the part of the management.

The ordering of supplies, other than those required on main haulage roads, should rest entirely with the face foremen, who are constantly in touch with the requirements of their respective districts, and in order to facilitate the delivery and prevent duplication, each district, level or room should have a distinct name or number. The face foremen make out the list of supplies required as they travel from place to place during the shift. Upon returning to the surface these lists are filed in a convenient place immediately available to the night foreman, who, at a glance has the situation in hand and has the necessary supplies on their way with the least possible friction.

The night foreman should be required at the end of the shift, to submit a daily statement of his delivery activities, specifying failure to deliver at any particular place and stating the reasons for such failure. This general statement should be placed in a conspicuous position for immediate checking by the face foremen before going on shift. The apportioning of the delivery work should be left entirely in the hands of the night foreman. A competent man will soon find the weak spots, and will never hesitate to make or suggest necessary changes.

JOHN BENNETT.
Cassidy, B. C., Canada

System of Delivering Supplies Affected by Local Conditions

GETTING supplies into a mine is a problem which every mine foreman must solve in accordance with his own conditions. A good many systems are in use throughout the country and one that I have found very successful is outlined below.

To receive orders for supplies, an assistant foreman should be posted in each section—or a workman if the foreman is not obtainable—where the workmen must pass him on their way out. As they go out they leave an order for the exact amount of material required for their next day's work or any job they are engaged on. This in turn is posted on a special bulletin board provided for the purpose. Strict enforcement of this rule will materially reduce complaints.

Having the order in, the next move is to insure delivery, which may most easily be accomplished by requiring a report from a responsible man in each crew, or the foreman if there is one. This report should show what material was delivered and the reasons for non-delivery, if any. The day foreman then knows what has happened and may make any further arrangements that are necessary.

When a night crew goes to work it should be understood that overtime must be avoided. The supply foreman, with the orders turned in by the day force, should easily be able to estimate the

amount of work to be done and distribute his crew accordingly, allotting each man or group of men what he will be able to finish in the shift. If the supply foreman believes that the work will require more time than the regular shift he should apply for extra help, as the practice of working men overtime will eventually wear them down and decrease their ability to do a good day's work.

GEO. DOBSON.

Martins Ferry, Ohio

Study Local Mine Conditions For Effective Distribution

NIGHT distribution of mine supplies should be carried out in the same systematic way that other mining operations are performed. Each individual mine usually has some peculiarities that will require the management to devise their own distribution system, as one method cannot be expected to work under all conditions.

Underground foremen and superintendents, according to my experience, should be provided with a printed form suitable for making duplicates and outlined in such a way that they will have at their finger tips the quantity, location and kind of supplies needed in all the different sections of the mine. This information may be secured from the section foremen or other subordinates and be submitted in carbon form to the night foreman in charge of mine supply distribution.

Using this system, the foreman may readily ascertain if the night crew has complied with his instructions and delivered the material in the time allotted. Once the system is established it will not be necessary for Mac to continue his house-cleaning program, as his method is obsolete among progressive mine executives.

C. T. GRIMM,
Mine Superintendent.

Adrian, W. Va.

Progress in Efficient Output Spells Success for Foreman

ESSENTIAL qualifications which a good foreman should possess are firmness, tact, organizing ability, knowledge of human nature and a good acquaintance with the men under his control. In addition, he should have a thorough knowledge of the work undertaken by all his men, but at the same time should have sufficient common sense not to interfere unduly with good workmen. A foreman may have considerable general knowledge but he cannot have the specialized knowledge of the man who is repeatedly doing one job.

A foreman can improve himself by studying other foremen's methods. This is best accomplished by studying the technical press and through membership in some society dealing with his profession. Taking note of any of his

own faults and trying to correct them also would help, as nothing destroys men's confidence so much as defects in the foreman's character.

The efficiency of production has a great effect on sales. Although the sales manager may actually sell the coal, it largely depends on the efficiency of the mine force as to whether this coal can be obtained at an economic price and contracts fulfilled on time, and it is on this factor that the success or non-success of the mine depends. As the foreman is the man who actually handles production, his attitude toward sales is an important one.

The foreman should keep himself acquainted with the newest and best equipment on the market, and also with the defects in his own equipment. These should be pointed out to the management, together with the reduction in cost and increase in output which could be effected with new equipment.

The actual maintenance of the equipment will come under the mine maintenance engineer, it being the foreman's rôle to see that the machinery is serviced at the proper time and that it is not used after it starts to become defective. He should see that men understand the equipment they handle, as many good machines are ruined annually by careless handling and lack of understanding on the part of the operatives. The foreman should see that the maintenance force is notified as to the condition of the machinery, and that his own men do not mishandle it.

W. E. WARNER.

Brentford, England

Why Do Miners Change Jobs?

MEN have always had the instinct to move from place to place, though the tendency is not so marked in modern times. They are especially prone to "settle down" if living and working conditions are right, and this applies especially to modern mining camps, where all the conveniences of the city dweller are offered. If future stabilization of coal mining is effected these conditions may be expected to improve still further.

Bosses are many men of many minds. First we have the class whose promotion to power leaves them much the same personally as they were before, though they are prone to work still harder to discharge the responsibility placed upon them. They give their best and by acting as leaders attempt to obtain the best from those over whom they are placed in charge. No foreman of this type has made a failure no matter how far he has climbed up the ladder of success.

Then there is the second type of foreman who has the idea that he is the first and last man that can run the job and that if he should quit or die it would go to the bow-wows. He sets no example, but depends on driving to obtain results and his accomplishments are on the

impermanent foundation of fear. When his men see a place where life is more worth living they will move—possibly to Laurel Run.

Some foremen seem to believe that they belong to a certain caste, with other castes above and below them. Where this idea persists throughout an organization there exists a situation in which the house is divided against itself. Consequently the miner will lean toward another place where the foreman is human and approachable and can be asked for advice without fear.

No foreman who is a real foreman will hold to this attitude, and that may be where the Old Man himself is in error. If this is so his state of mind is handed on down to Jim and Mac, to result in dissatisfaction among the men. The proper thing, then, is for the Old Man to "get next" to himself and find out what his own trouble is, for he above everyone else is responsible for directing the foremen. It is a fact that those below look to him for guidance if he is a real example and are trying to please him. While he may not be able to devote his personal attention to the problems of each individual he should see that men are appointed and trained to take charge.

There is no doubt that there should be a division of labor in coal mining, and while its approach is slow it is surely coming. The old days when the miner did everything himself, even to pushing his car out on the main road, are already past, and the future will see men as operators of machines which do the actual work. It is, therefore, the duty of every mine foreman to make a study of mechanized mining as it develops and to instruct his men in their probable worth as agents in reducing costs and displacing hand labor. In this way, the advent of the machine will not result in suffering due to ignorance or distrust on the part of the worker.

Co-operation with the management in the modernization of methods should be the attitude of the company, as those

who fail to modernize may as well go into some other business before they are driven out by competition. But the company which keeps modernization in mind and believes in co-operation from the Old Man on down to the lowliest laborer will certainly live and prosper.

Indiana

J. A. N.

Fair Deal Given and Demanded If Foreman Is on His Toes

A FOREMAN should have a concise understanding of management and its policies—of men as well as materials, methods and machinery—and a realization that his personal efficiency and the efficiency of his department is dependent upon his understanding of human nature and its practical application not only to men but to the management. The efficiency of his service, and therefore its value to others, depends on the degree of his faithfulness in applying the principle of efficiency.

The foreman should give and demand a square deal and let justice be the ruling factor in all his dealings with others; there should be no attempt to override the rights of others, nor should there be any weak submission to invasion of his own rights. What is expected of the foreman and what he should demand is a fair deal.

The foreman of today must be more able than he who held the position ten years ago and he must be continually after fresh knowledge of more effective ways of obtaining output and the co-ordination of labor, power and machinery. He must wean himself from old ideas, and in order to keep in step with the march of progress he must keep his mind alive, awake and feed it with new ideas. At the office of the Woodward colliery of the Glen Alden Coal Co. is a motto: "He That Follows Is Behind," which is offered as an incentive to its officials to strike out on their own initiative to obtain the training that is essential to good foremanship. This is the mechanical age and as such it demands special training if the best results are to be obtained.

The day is past when all that is black can be sold as coal; the public is well informed as to the merits of the different coals due to keen competition, advertising and talks over the radio on the commodity. Competitive conditions demand that the product be cleaned and prepared in a proper manner, and the foreman can assist the sales department by insisting that coal be cleaned at the face.

Before the foreman abandons any old equipment he should investigate the merits of the different types of modern equipment to see if they will accomplish the work intended for them and with safety and economy. The record of economies effected and of difficulties surmounted bears indisputable evidence as to the value of modern machinery.

WILLIAM J. DAVIES.

Edwardsville, Pa.

Running Over

That superintendents, mine foremen and electricians are alive to all possibilities and move with the times is amply proved by the expressions of opinion appearing in the Bosses' Department. So much material is now on hand that "Coal Age" is forced to hold over a number of interesting letters on "Controlling Night Delivery of Supplies" until the February issue.

THE COAL MARKETS

In 1928



Collapse of Jacksonville Agreement Is High Spot in Colorless Year

IN A YEAR singularly lacking in dominant developments the settlement through district wage agreements of the long-drawn-out labor controversy in the union fields of Illinois, Indiana, central Ohio and the Southwest was the outstanding event in the bituminous market situation in the past year. A number of mines, it is true, were working under a truce pact and—later—individual agreements, but the acceptance of a wage cut by the miners increased the potential production.

This increase in available supply was not an unmixed blessing, however, as the large reserve stocks that had been accumulated and carefully utilized by coal consumers against a possible long siege of labor difficulties were not calculated to cause a scramble of consumers to buy coal. The supply in storage and increasing economies in its use in fact proved an obstacle to buoyant market conditions throughout the year. Consumers' stocks on Jan. 1 were approximately 55,500,000 tons. Weekly production during the first quarter averaged 9,963,000 tons; consumption during the same period was estimated at 10,636,000 tons. During the next three months production fell to a weekly average of 8,052,000 tons and consumption dropped to 8,312,000 tons. Reserves during the six months diminished 13,800,000 tons and during the third quarter only 600,000 tons.

There was no approach to a price flurry throughout the year, quotations moving within a comparatively restricted range. Variations were in large measure governed by seasonal developments and, in minor instances, shifts in tonnage. The Senate investi-

gation in the western Pennsylvania, eastern Ohio and northern West Virginia mining fields had only an academic interest to the trade. Even the expiration of the truce agreement in the central West and Southwest, casting, as it did, the shadow of a tie-up in the remnants of the union fields, failed to have any notable effect on the market situation. Buying was limited largely to current requirements—usually when conditions were favorable to the consumer—so that from the standpoint of sales realizations the market as a whole was far from being all that could be desired.

Spot prices for the country as a whole fluctuated slightly during the first three months, then took a marked dip, which held throughout the summer. The average for January, February and March was \$1.87; for the next five months it varied from \$1.71 to \$1.74. With the approach of autumn there was a moderate advance, which continued until the closing weeks of the year, when the

tendency was markedly softer. The weighted average for December was \$1.82.

The steadiest and most dependable feature of the bituminous trade last year, as in the preceding twelve-month, was the larke cargo business. Shipments of cargo coal for the season to Dec. 31 were 33,402,121 net tons, as compared with 32,851,681 tons for the corresponding period in 1927 and 28,159,076 tons in 1926. In exceeding the 1927 figure the movement to the lakes last year established a new record. This achievement was all the more remarkable when it is considered that the season of navigation on the lakes last year opened later than usual. Once the movement got under way, however, shipments were maintained in steady volume.

A noteworthy factor in making this record possible was the prompt movement of tonnage from the docks in the Northwest. Commercial stocks of bituminous at the Head of the Lakes at

the close of the year were 6,402,000 tons, a decrease of 142,800 tons from the preceding year's figure; anthracite stocks were 562,857 tons, a decline of 392,000 tons.

The progressive decline in the export trade which set in with the settlement of the British strike of 1926 continued last year. During the eleven months ended Nov. 30, 1928, the exports of bituminous coal were only 13,338,743 gross tons. For the corresponding period in 1927 they totaled 15,249,506 tons and in the first eleven months of 1926 they were 27,193,309 tons. Anthracite also slipped slightly, with an eleven months total of 2,720,725 tons, as against 2,742,782

Average Spot Prices of Bituminous Coal, F.o.b. Mines

		(Unit, net ton of 2,000 lb.)													
Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	
January.....	\$1.13	\$1.53	\$4.15	\$2.48	\$2.57	\$2.57	\$3.26	\$2.25	\$4.38	\$2.21	\$2.10	\$2.18	\$2.34	\$1.85	
February.....	1.12	1.40	4.18	2.53	2.49	2.58	2.77	2.20	3.59	2.25	2.04	2.09	2.11	1.86	
March.....	1.09	1.27	3.89	2.58	2.47	2.58	2.63	2.22	3.20	2.15	1.99	2.01	2.06	1.91	
April.....	1.08	1.24	3.21	2.64	2.43	3.85	2.62	2.24	2.84	2.07	1.95	1.92	1.93	1.74	
May.....	1.07	1.21	4.14	2.67	2.38	4.59	2.68	3.11	2.68	2.04	1.97	1.93	1.87	1.73	
June.....	1.07	1.26	4.00	2.57	2.40	7.18	2.52	3.32	2.56	2.03	1.95	1.90	1.85	1.73	
July.....	1.05	1.22	3.17	2.58	2.47	8.24	2.40	4.67	2.40	1.98	1.93	1.91	1.87	1.71	
August.....	1.07	1.30	3.24	2.58	2.76	9.51	2.42	6.13	2.39	1.99	2.04	2.00	2.06	1.74	
September.....	1.10	1.57	2.02	2.58	2.91	8.52	2.37	5.08	2.46	2.02	2.18	2.15	2.07	1.81	
October.....	1.12	2.26	2.02	2.58	3.09	7.78	2.33	4.48	2.28	2.10	2.13	2.70	1.96	1.83	
November.....	1.17	3.87	2.48	2.58	2.57	5.87	2.35	4.11	2.25	2.06	2.26	3.19	1.90	1.85	
December.....	1.33	4.01	2.48	2.58	2.58	4.38	2.26	4.05	2.18	2.06	2.19	2.53	1.90	1.81	
1st Quarter.	\$1.11	\$1.40	\$4.07	\$2.53	\$2.51	\$2.58	\$2.89	\$2.19	\$3.72	\$2.20	\$2.04	\$2.09	\$2.17	\$1.87	
2d Quarter.	1.07	1.24	3.78	2.63	2.40	5.20	2.61	2.64	2.69	2.04	1.96	1.92	1.88	1.73	
3d Quarter.	1.07	1.36	2.81	2.58	2.71	8.76	2.40	5.46	2.42	2.00	2.05	2.02	2.00	1.75	
4th Quarter.	1.21	3.38	2.33	2.58	2.74	6.01	2.31	4.21	2.23	2.07	2.19	2.81	1.92	1.83	
Yearly aver.	\$1.12	\$1.85	\$3.25	\$2.58	\$2.59	\$5.64	\$2.55	\$3.67	\$2.77	\$2.08	\$2.06	\$2.21	\$1.99	\$1.80	

Relative Prices of Bituminous Coal

		(Spot prices July, 1913-June, 1914, as base)													
Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	
January....	93	126	343	205	213	212	270	186	362	183	173	180	190	152	
February....	92	116	346	209	206	213	229	182	297	186	168	172	174	152	
March.....	90	105	321	214	204	213	217	175	264	178	165	166	170	158	
April.....	89	103	265	218	200	318	217	185	235	171	161	159	159	144	
May.....	89	100	342	221	197	379	222	257	221	169	162	159	155	143	
June.....	88	104	331	212	198	593	208	274	212	167	161	157	153	143	
July.....	87	101	262	213	204	681	198	386	198	163	160	158	154	141	
August.....	88	107	268	213	228	786	200	507	198	164	166	165	170	144	
September..	91	130	167	213	241	704	196	461	203	167	179	178	171	150	
October....	93	187	167	213	256	643	193	370	188	174	176	223	162	152	
November..	97	320	205	213	212	485	194	340	186	170	187	264	157	153	
December..	110	332	205	213	213	362	187	335	180	170	181	209	157	149	
1st Quarter.	92	116	337	209	208	213	239	181	307	182	169	173	178	153	
2d Quarter.	89	102	313	217	198	430	216	218	222	169	162	158	156	143	
3d Quarter.	89	113	232	213	224	723	198	451	200	165	168	167	165	145	
4th Quarter	97	280	192	213	227	497	191	438	184	171	181	232	159	151	
Yearly aver.	91	152	269	213	214	466	211	303	226	172	170	182	164	148	

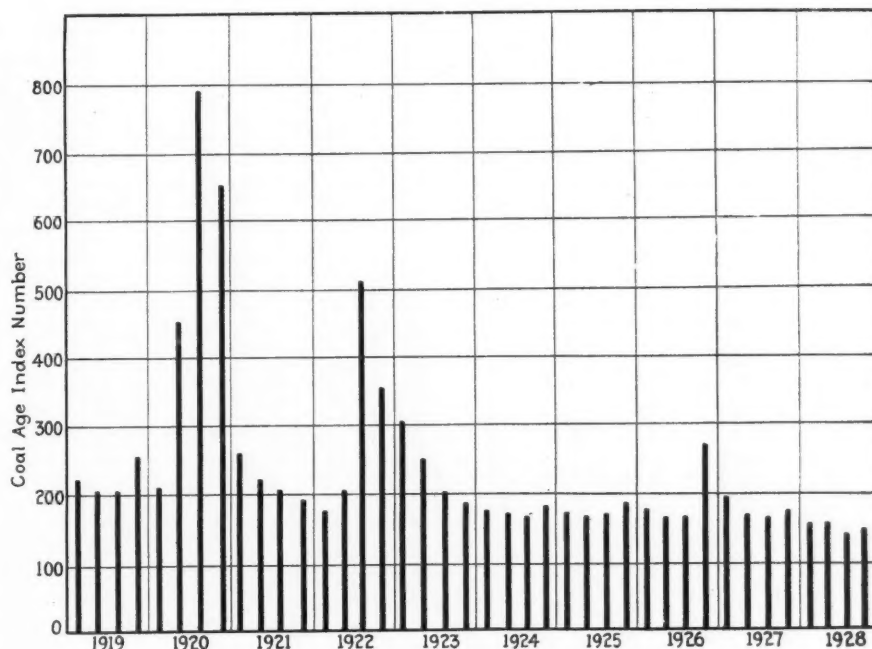
tons during the corresponding period in 1927.

There was a further decline in the output of anthracite last year, the total for which is estimated at 76,770,000 net tons as compared with 80,650,000 tons in 1927. Shipments showed a corresponding decrease during the past year in comparison with the preceding year.

Unusually mild weather in the latter part of last winter as well as in the closing weeks of the year was largely to blame for this recession. Another disturbing factor, making for uneven distribution of output at the mines, was the increased disinclination of consumers to lay in supplies in advance of requirements. A gratifying increase in shipments of hard coal to the New England States and Canada was partly offset by a further decline in shipments to the Northwest.

The one bright spot in an otherwise disappointing year to Midwestern operators was the assurance of lower production costs brought about by the collapse of the Jacksonville agreement and acceptance by the union of a 17 per cent cut in wages. The immediate effect was not great, for consumers were irritatingly consistent in adhering to a hand-to-mouth buying policy throughout the greater part of the year.

The most persistent check to buying throughout the greater part of the year was uncertainty over the wage problem, and when that was settled there was a sigh of relief and a realization that there was no pressing need to buy



Relative Spot Prices of Bituminous Coal

In constructing Coal Age Index number of spot prices on bituminous coal the average for the year ended June, 1914, on fourteen coals representative of a large part of the annual output of the United States is taken as 100. Prices on these coals are weighted first with respect to the proportions of slack, mine-run and prepared sizes shipped and second with respect to the tonnage each district produced.

more coal. Illinois' recovery in production was fairly rapid, reaching approximately 1,200,000 tons a week toward the close of the year. Shaft operators in Indiana, however, have not been so fortunate, as the increasing output by strip mines has proved a serious competitive element. Western Kentucky fuels were hard hit in the Chicago market by the wage cut and subsequent price reduction in Illinois and Indiana.

Prepared smokeless grades enjoyed the nearest approach to a price flurry with the first appearance of cold weather in October, when lump and egg advanced to \$4@\$.425 from a low of \$.225 early in the summer. This was short-lived, however, as lump was moving on mine-run contracts in late November and December, and egg, stove and nut were moved with some difficulty. Ordinary grades of eastern Kentucky and West Virginia high-volatile fuels were relatively cheap at all times, but premium product moved fairly well.

The trade in the St. Louis area was handicapped by unfavorable weather throughout a large portion of the year. Steam was uncertain and always a buyers' market with plenty of non-union western Kentucky fuel to compete with the Illinois product. Summer storage was a disappointment, too. West Virginia smokeless lost ground in St. Louis while high-grade southern Illinois product crowded out middle grades.

The year was fairly satisfactory at the Head of the Lakes. Low temperatures in January and February brought good demand and capacity shipments for weeks at a time. There was a sharp slackening in March, with shipments slow in May, June and July. Inquiry picked up in August and movement from then until the end of the year

was active. West Virginia smokeless continued to grow in favor and despite heavy receipts during the last season some of the docks have barely sufficient to meet their needs to the end of the closed season of navigation. The demand for anthracite was much slower.

Bituminous Coal Output, Spot Prices And Index, by Weeks, 1928

Week Ended	Production (Net Tons)	Average Spot Price	Coal Age Index
Jan. 2	9,848,000	\$1.95	161
Jan. 14	10,865,000	1.94	160
Jan. 21	9,724,000	1.75	144
Jan. 28	10,121,000	1.74	144
Feb. 4	10,105,000	1.87	154
Feb. 11	9,749,000	1.86	153
Feb. 18	9,374,000	1.84	151
Feb. 25	10,177,000	1.86	153
Mar. 3	10,036,000	1.88	155
Mar. 10	10,392,000	1.89	156
Mar. 17	9,943,000	1.88	155
Mar. 24	9,871,000	1.89	156
Mar. 31	9,309,000	2.05	169
April 7	7,158,000	1.76	145
April 14	7,415,000	1.73	143
April 21	7,917,000	1.71	141
April 28	8,192,000	1.77	146
May 5	8,174,000	1.73	143
May 12	8,392,000	1.79	148
May 19	8,182,000	1.71	141
May 26	8,374,000	1.71	141
June 2	7,382,000	1.72	142
June 9	8,412,000	1.73	143
June 16	8,342,000	1.72	142
June 23	8,391,000	1.73	143
June 30	8,444,000	1.73	143
July 7	8,830,000	1.71	141
July 14	8,610,000	1.70	140
July 21	8,642,000	1.71	141
July 28	8,964,000	1.71	141
Aug. 4	8,757,000	1.74	144
Aug. 11	9,002,000	1.76	145
Aug. 18	8,959,000	1.72	142
Aug. 25	9,276,000	1.70	140
Sept. 1	9,436,000	1.78	147
Sept. 8	8,935,000	1.78	147
Sept. 15	10,197,000	1.77	146
Sept. 22	10,021,000	1.81	150
Sept. 29	11,056,000	1.88	155
Oct. 6	11,039,000	1.91	158
Oct. 13	11,274,000	1.89	156
Oct. 20	10,832,000	1.86	154
Oct. 27	11,248,000	1.88	155
Nov. 3	11,140,000	1.88	156
Nov. 10	10,546,000	1.86	154
Nov. 17	10,924,000	1.81	150
Nov. 24	10,982,000	1.84	152
Dec. 1	9,906,000	1.86	154
Dec. 8	11,211,000	1.86	154
Dec. 15	11,035,000	1.84	152
Dec. 22	11,056,000	1.77	146
Dec. 29	6,890,000	1.76	145

Coal Receipts in Last Eight Years at Upper Lakes Docks

	Hard	Soft	Total
1921	1,844,642	8,320,207	10,164,849
1922	566,362	5,138,934	5,705,296
1923	1,419,984	11,268,337	12,688,321
1924	1,289,994	7,730,878	9,020,872
1925	790,132	8,882,569	9,672,701
1926	1,272,973	9,168,656	10,441,629
1927	981,194	11,452,444	12,433,638
1928	652,095	9,688,342	10,340,437
Av. total received during last eight years			10,433,468

Receipts of Coal at Duluth-Superior Docks in 1928 by Months*

	Hard	Soft	Total
May	40,186	1,432,531	1,472,717
June	111,996	1,377,496	1,489,492
July	168,065	1,597,929	1,765,994
August	102,017	1,856,976	1,958,993
September	80,197	1,326,222	1,406,419
October	87,947	1,074,820	1,162,767
November	61,687	943,229	1,004,916
December		79,139	79,139
Totals	652,095	9,688,342	10,340,437

*U. S. Harbor Engineer's Office, Duluth.

Coal Shipments in 1928 From Docks At Head of the Lakes*

	1928 Cars	1927 Cars	1926 Cars
January	27,250	27,547	23,990
February	22,804	21,091	19,219
March	18,518	14,646	14,836
April	14,135	13,218	11,855
May	14,717	15,117	11,808
June	12,279	14,495	12,659
July	12,585	13,267	16,223
August	19,332	23,703	18,306
September	25,003	25,794	27,590
October	29,928	32,178	30,993
November	27,492	30,109	35,531
December	26,000	35,909	32,687
Totals	250,043	267,074	258,697

* Western Weighing & Inspection Bureau.

Generally slow wholesale trade in Kansas City last year and the strike of Kansas deep-shaft miners from April 1 to Sept. 1 caused a drop of nearly a million tons in Kansas output. Lump prices were best in January, when Kansas deep-shaft grades brought as high as \$4.75; the low point was from April to August, with the top at \$4; shovel lump was down to \$3 in the same period. Kansas screenings reached a high of \$2.50@2.75 in May, but dipped to \$1.50 in September, with the product from other fields as low as \$1.25. In December screenings were scarce and advanced irregularly.

The trade in Colorado and New Mexico was largely dominated by the weather—mostly in an unfavorable way—and though there was an upturn as autumn approached an unseasonable rise in temperature had an adverse effect on demand.

The Utah trade had a fight on its hands most of the year against the proposed introduction of natural gas, but the new fuel will be available next August. Coal output, however, compared favorably with 1927. Mine prices were as follows throughout most of the year: Lump, \$4.50; domestic lump, \$4.25; stove, \$4; nut, \$2.75; screened

slack, \$2; slack, \$1, but the slack schedule was not strictly adhered to. There were no summer storage rates, so that this class of trade declined notably from former years.

The past year was disappointing to the Kentucky trade. Wage reductions in the union fields north of the Ohio and increased freight rate differentials in favor of Northern mines on lake cargo shipments made competitive conditions difficult. Prices sagged considerably, showing an average decline of 25c. or more in western Kentucky. Eastern Kentucky did somewhat better, due to the fairly firm tone maintained by premium grades. Colder weather at the close of the year quickened interest in domestic sizes; industrial demand was fair, with room for improvement in steam business. Prices were a little better, especially for screenings, as demand for prepared sizes has been light.

At Cincinnati the market was groping to find its bearings all year. The lake rate imbroglio, culminating in favor of Pennsylvania and Ohio, was a disconcerting element, as lake business became a factor whose influence extended to inland contracts and sales. Prices, with the exception of smokeless, sagged, and when activity failed to develop in mid-summer the trade suffered its greatest depression in ten years.

A sudden cold snap early in September, however, caught retailers and steam plants short with high spot prices coming in. The new level was maintained in succeeding months for the better grades, but the others fell back. From May until the end of the year steam and slack were the greatest worry. In the retail end business was steady.

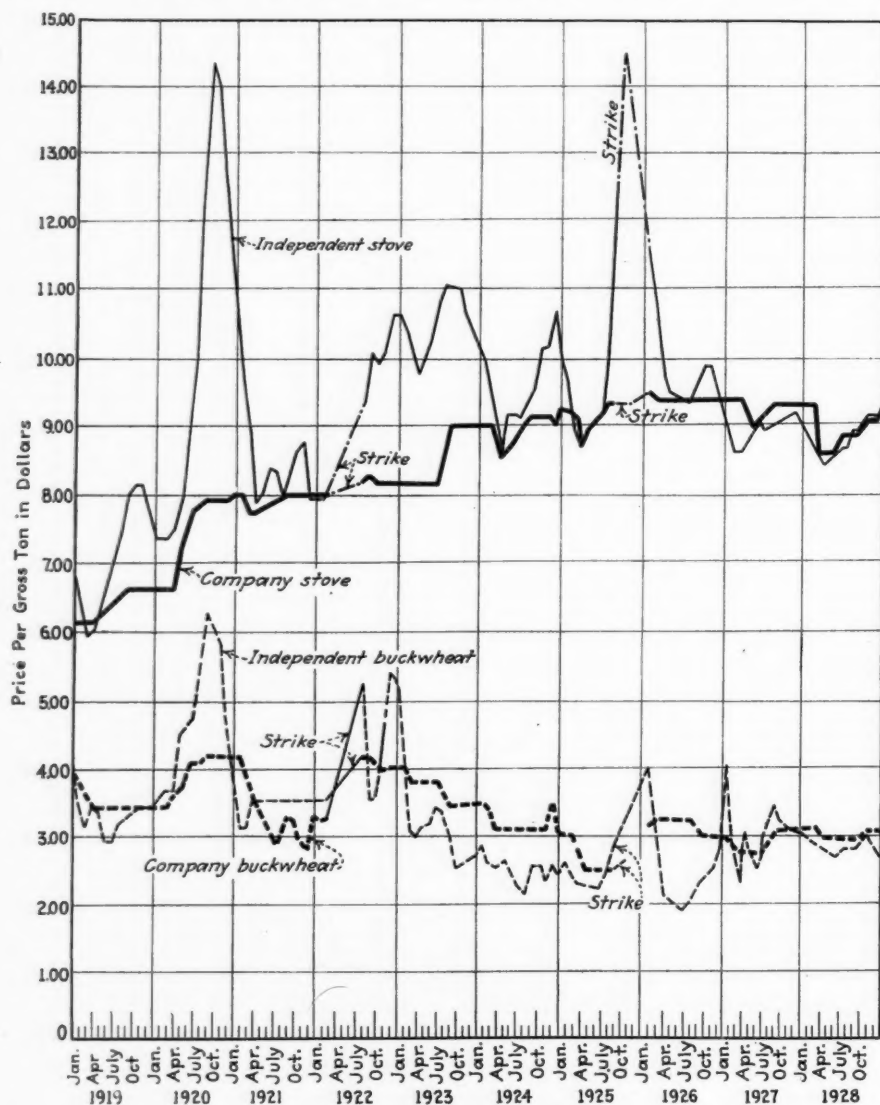
Outside of a few weeks of fairly large demand in late August and early September, it was a dull year for all varieties of coal in Columbus, with prices tending steadily downward. Even the domestic trade, which promised well as the old year opened, failed to develop as expected, and dragged at the close. The resumption of production at Ohio mines only served to complicate the situation, as the added output was sold under pressure. Steam trade was consistently quiet throughout the year, with contracting below normal and many large users buying when favorable opportunities offered in the open market. The situation in Cleveland closely paralleled that in Columbus, adverse weather limiting demand and prices showing a progressively softening tendency.

Sales started slowly last year in the Pittsburgh coal market but gained gradually until the peak in production was reached in October, when prices started to slide and were still slipping at the close of the year. The promise of early autumn succumbed to adverse weather and overproduction of domestic grades. A wage cut by the Pittsburgh Coal Co. and abandonment of the Jacksonville scale were important developments.

Central Pennsylvania producers made progress during the year in efficiency, lower costs and better preparation in an effort to win back lost markets. Production declined at a ratio slightly in

Average Monthly Quotations for Independent Anthracite In New York Market in 1928

	Egg	Stove	Chestnut	Pea	No. 1 Buckwheat	Rice	Barley
Jan.	\$8.35-\$8.75	\$8.90-\$9.25	\$8.75-\$9.00	\$5.50-\$6.00	\$2.95-\$3.20	\$2.30-\$2.50	\$1.50-\$1.75
Feb.	8.30-8.75	8.65-9.15	8.45-8.75	5.35-6.00	2.80-3.15	2.15-2.35	1.50-1.65
March	8.35-8.70	8.60-9.15	8.35-8.75	5.25-6.00	2.75-3.25	2.00-2.25	1.35-1.65
April	8.00-8.25	8.45-8.60	8.00-8.25	4.60-5.00	2.80-3.00	2.15-2.25	1.50-1.75
May	8.00-8.25	8.40-8.60	8.00-8.25	4.70-5.00	2.70-3.00	1.90-2.25	1.45-1.75
June	8.20-8.25	8.55-8.80	8.10-8.40	4.75-5.00	2.60-3.00	1.80-2.25	1.30-1.65
July	8.25-8.50	8.60-8.85	8.25-8.50	4.75-5.00	2.70-3.00	1.80-2.15	1.20-1.70
Aug.	8.30-8.50	8.60-8.85	8.10-8.50	4.50-5.00	2.85-3.00	2.00-2.25	1.40-1.75
Sept.	8.50-8.75	8.85-9.10	8.45-8.75	4.50-5.00	2.85-3.00	1.75-2.25	1.45-1.75
Oct.	8.60-8.75	8.85-9.10	8.55-8.75	4.75-5.00	2.85-3.25	2.25-2.50	1.75-2.00
Nov.	8.60-8.75	9.10-9.25	8.60-8.75	4.50-5.00	2.70-3.00	1.50-1.75	1.00-1.50
Dec.	8.35-8.60	9.10-9.25	8.60-8.75	4.50-5.00	2.55-2.85	1.45-1.80	1.00-1.50



Anthracite Prices for Ten Years

This diagram shows in dollars per gross ton the average company circular price and average spot quotations on "independent" stove and No. 1 buckwheat, f.o.b. mine basis, as quoted on the New York market.

excess of the loss in output for the country as a whole. Loadings showed a tendency to pick up in December and there was an appreciable decline in "no bills."

While in many ways the New England steam coal market during 1928 was disappointing there was a better attitude in the trade and among producers; output has been co-ordinated to sales and accumulations at the Virginia terminals are less in evidence. In consequence prices showed a more even range in the late months of the year than was typical in the first half.

Quotations showed a steady improvement during the year, although from \$3.90 in January there was no period of more than a fortnight when the f.o.b. vessel price of Navy Standard was above the December high mark of \$4.50. For inland delivery spot mine-run went from \$5 per gross ton on cars to \$5.50 @ \$5.60, with nut-and-slack 50@60c. less. All-rail Pennsylvania coals showed scarcely any notable price variations throughout the year.

There were continued complaints of poor prices at New York, though a large tonnage moved through the market last year. Producers of the cheaper grades were the chief sufferers. Movement on contracts was fairly steady, the only brisk periods being when consumers occasionally allowed stocks to dwindle. More than usual interest was shown in Southern coals, and while the prices were rather low they were better than central Pennsylvania grades brought.

From the standpoint of stability at least the Philadelphia market showed some improvement last year. Tonnage was plentiful and prices, as a result, not so good. Fewer contracts than usual in effect, consumers preferring to buy in the open market. Industrial conditions, however, are sound and the outlook is promising.

Industrial coal consumption in Baltimore during the past year was considerably less than in preceding years and consumers pursued a watchful waiting policy. As a result the trade had few bright spots. Buying was largely confined to the spot market, with much dependence placed on the weather, which was little better than a reed in the matter of support.

Both the producing and selling divisions of the Birmingham trade had a trying time in 1928. Industrial demand was far below that of 1927 and sales in the open market were confined to current needs. Sharp competition kept prices unstable and limited profits.

The anthracite producers are making a valiant attempt to regain lost markets, but with disappointing results thus far. Demand in New York was unsatisfactory throughout the year. The weather was adverse and competition from substitutes, especially coke, was keen. For a time egg led in demand, later being displaced by stove, only to give place later to chestnut. Pea lagged at nearly all times and the steam sizes had plenty of trouble. Much the same problems controlled the situation in Philadelphia and Baltimore.

Coal Age Spot Prices, F.O.B. Mines, for 1928

Southern Illinois (Franklin County) Coals

CHICAGO MARKET

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lump.....	\$3.13	\$2.75	\$2.65	\$2.63	\$2.55	\$2.53	\$2.53	\$2.81	\$2.98	\$2.88	\$2.89	\$2.93
Mine-run.....	2.38	2.34	2.33	2.15	2.15	2.15	2.15	2.33	2.33	2.33	2.29	2.20
Screenings.....	1.69	1.79	1.83	1.83	1.70	1.69	1.58	1.50	1.50	1.38	1.37	1.47
Weighted Av.—All sizes	2.62	2.44	2.39	2.32	2.25	2.25	2.23	2.40	2.49	2.44	2.41	2.43

Central Illinois Coals

CHICAGO MARKET

Lump.....	2.63	2.45	2.56	2.45	2.30	2.30	2.30	2.45	2.47	2.45	2.53	2.53
Mine-run.....	2.18	2.18	2.18	2.00	2.05	2.05	2.05	2.05	2.05	2.05	2.02	2.00
Screenings.....	1.53	1.54	1.68	1.68	1.59	1.53	1.44	1.55	1.36	.80	1.09	1.19
Weighted Av.—All sizes	2.28	2.20	2.26	2.16	2.08	2.07	2.05	2.16	2.13	2.04	2.10	2.11

Coals of Mt. Olive District

ST. LOUIS MARKET

Lump.....	2.63	2.53	2.50	2.50	2.41	2.35	2.35	2.35	2.43	2.50	2.41	2.35
Mine-run.....	2.00	2.19	2.25	2.22	2.13	2.25	2.25	2.20	2.00	2.00	2.05	2.25
Screenings.....	1.50	1.55	1.56	1.65	1.50	1.50	1.50	1.40	1.31	1.00	1.28	1.40
Weighted Av.—All sizes	2.21	2.24	2.25	2.26	2.15	2.17	2.17	2.13	2.08	2.06	2.09	2.15

Coals of Standard District

ST. LOUIS MARKET

Lump.....	2.49	2.33	2.35	2.32	2.06	2.00	1.98	2.00	2.19	2.35	2.15	2.00
Mine-run.....	1.83	1.83	1.75	1.78	1.76	1.70	1.68	1.71	1.75	1.75	1.74	1.70
Screenings.....	0.98	1.02	1.45	1.45	1.26	1.20	1.18	.98	.70	.33	.58	.95
Weighted Av.—All sizes	1.99	1.92	1.97	1.98	1.82	1.76	1.73	1.72	1.78	1.79	1.74	1.71

Indiana Fourth and Fifth Vein Coals

CHICAGO MARKET

Lump.....	2.69	2.65	2.63	2.38	2.39	2.44	2.44	2.41	2.47	2.45	2.56	2.53
Mine-run.....	1.91	1.88	1.90	1.83	1.81	1.78	1.75	1.73	1.75	1.73	1.88	1.67
Screenings.....	1.68	1.61	1.78	1.78	1.59	1.46	1.28	1.33	1.18	1.03	1.16	1.23
Weighted Av.—All sizes	2.19	2.13	2.18	2.04	2.00	1.98	1.94	1.91	1.92	1.88	2.00	1.93

Western Kentucky Coals

AVERAGE OF QUOTATIONS ON CHICAGO AND LOUISVILLE MARKETS

Lump.....	1.82	1.69	1.74	1.65	1.46	1.56	1.44	1.37	1.66	1.95	1.92	1.90
Mine-run.....	1.16	1.22	1.26	1.21	1.04	1.01	.99	1.03	1.09	1.09	1.01	1.09
Screenings.....	.91	.92	1.22	1.24	1.03	1.03	.93	.78	.64	.58	.58	.76
Weighted Av.—All sizes	1.34	1.32	1.42	1.37	1.18	1.21	1.14	1.09	1.21	1.30	1.26	1.30

Southeastern Kentucky Coals

AVERAGE OF QUOTATIONS ON CINCINNATI, CHICAGO AND LOUISVILLE MARKETS

Lump.....	2.43	2.32	2.28	2.17	1.98	1.97	1.97	2.12	2.24	2.64	2.61	2.45
Mine-run.....	1.45	1.44	1.53	1.53	1.44	1.42	1.43	1.50	1.52	1.48	1.38	1.44
Screenings.....	.80	.69	.87	1.12	1.07	1.03	.91	.79	.73	.68	.66	.76
Weighted Av.—All sizes	1.94	1.86	1.88	1.84	1.72	1.70	1.68	1.76	1.83	2.09	2.00	1.94

Hocking District (Ohio) Coals

COLUMBUS MARKET

Lump.....	2.14	2.18	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	1.93
Mine-run.....	1.68	1.68	1.68	1.68	1.68	1.65	1.68	1.68	1.67	1.47	1.38	
Screenings.....	1.12	1.11	1.16	1.13	1.21	1.25	1.27	1.19	.98	1.04	.79	.75
Weighted Av.—All sizes	1.80	1.81	1.80	1.79	1.80	1.81	1.80	1.80	1.77	1.77	1.65	1.52

Pittsburgh No. 8 (Ohio) Coals

CLEVELAND MARKET

Lump.....	1.88	1.91	1.88	1.86	1.91	1.95	1.95	1.95	2.01	2.08	1.87	1.74
Mine-run.....	1.55	1.49	1.47	1.49	1.53	1.61	1.58	1.58	1.56	1.48	1.42	1.58
Screenings.....	1.15	1.15	1.09	1.12	1.25	1.24	1.21	1.13	1.02	.95	.83	1.53
Weighted Av.—All sizes	1.56	1.59	1.56	1.56	1.65	1.67	1.65	1.64	1.63	1.62	1.49	1.62

Pittsburgh District (Pennsylvania) Coals

PITTSBURGH MARKET

Lump.....	2.20	2.05	2.04	2.07	2.07	2.00	2.07	2.09	2.07	2.05	2.01	1.95
Mine-run.....	1.81	1.80	1.60	1.60	1.60	1.60	1.65	1.64	1.64	1.66	1.65	1.70
Screenings.....	1.15	1.15	1.06	1.16	1.20	1.11	1.18	1.21	1.11	1.01	.96	.95
Weighted Av.—All sizes	1.77	1.72	1.59	1.62	1.63	1.60	1.64	1.65	1.63	1.61	1.59	1.60

Mine-Run Coal From Cambria, Somerset and Clearfield Districts

BOSTON MARKET

Cambria.....	1.95	1.89	2.14	2.09	2.00	1.99	2.00	2.03	2.09	1.90	1.98	2.00
Somerset.....	2.07	1.96	1.93	1.85	1.82	1.79	1.80	1.70	1.77	1.88	1.88	1.88
Clearfield.....	1.82	1.75	1.78	1.66	1.65	1.64	1.63	1.58	1.63	1.75	1.74	1.78

Southern West Virginia Smokeless Mine-Run Coal

VARIOUS MARKETS

Columbus.....	2.00	1.91	1.88	1.88	1.88	1.88	1.83	1.91	2.02	2.14	2.13	1.78
Chicago.....	2.07	2.03	2.00	1.82	1.85	1.84	1.88	2.00	2.00	2.10	1.93	2.00
Cincinnati.....	2.11	2.18	2.03	1.87	1.90	2.07	2.12	2.05	2.15	2.26	2.10	2.06
Boston.....	1.34	1.37	1.20	1.34	1.33	1.41	1.38	1.38	1.52	1.66	1.83	1.88
Average—All markets	1.89	1.87	1.78	1.73	1.74	1.80	1.80	1.83	1.92	2.02	2.00	1.93

Fairmont District (W. Va.) Coal

PHILADELPHIA MARKET

Mine-run.....	1.43	1.43	1.40	1.39	1.34	1.33	1.33	1.33	1.33	1.33	1.34	1.38
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Southern West Virginia High-Volatile Coals

AVERAGE OF QUOTATIONS ON COLUMBUS AND CINCINNATI MARKETS

Lump.....	2.53	2.33	2.14	2.06	1.98	1.95	1.96	1.98	2.15	2.37	2.23	2.41
Mine-run.....	1.41	1.43	1.43	1.43	1.45	1.43	1.40	1.40	1.42	1.50	1.32	1.38
Screenings.....	.79	.78	.88	1.10	1.06	.94	.88	.91	.89	.82	.81	.70
Weighted Av.—All sizes	1.64	1.58	1.55	1.56	1.54	1.50	1.47	1.48	1.55	1.64	1.50	1.56

Big Seam (Alabama) Coals

BIRMINGHAM MARKET

Lump.....	2.32	2.13	1.94	1.75	1.88	1.75	2.00	1.88	2.00	2.00	2.13	2.13
Mine-run.....	1.75	1.75	1.58	1.58	1.58	1.50	1.38	1.38	1.38	1.38	1.38	1.38
Washed.....	1.84	1.88	1.88	1.88	1.75	1.75	1.75	1.75	1.75	1.75	1.85	1.75

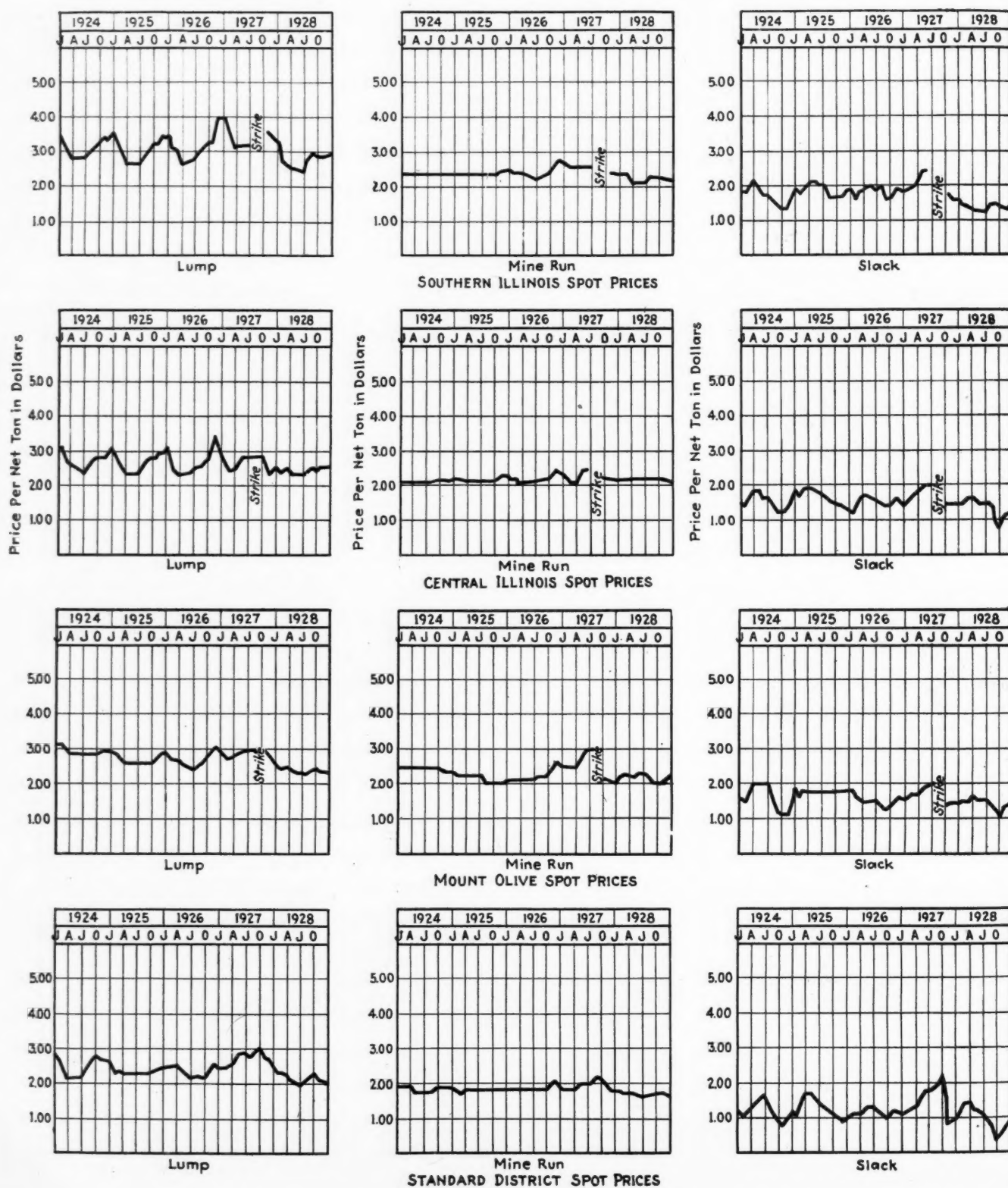
Eastern Coals

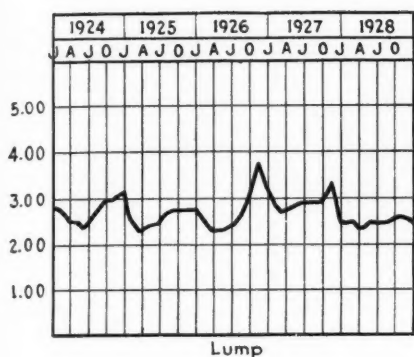
NEW YORK MARKET

Pool 1 (Navy Standard)	2.60	2.58	2.53	2.48	2.48	2.43	2.40	2.40	2.40	2.38	2.38	2.38
Pool 9 (super low vol.)	2.03	2.10	2.03	1.98	1.95	1.85	1.83	1.83	1.83	1.83	1.83	1.83
Pool 10 (h. gr. (low vol.))	1.78	1.78	1.78	1.75	1.75	1.75	1.70	1.70	1.70	1.68	1.68	1.68
Pool 11 (low vol.)	1.63	1.63	1.60	1.53	1.55	1.55	1.50	1.50	1.40	1.40	1.40	1.40
Pool 34.....	1.38	1.40	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38

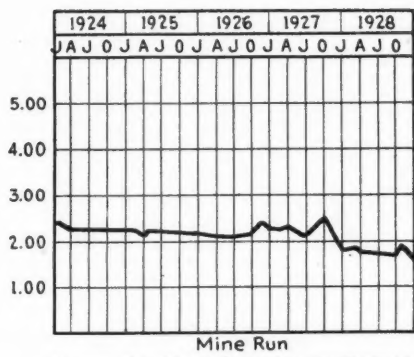
Bituminous Spot Coal Price Trends 1924-1928

Graphs following show the trend of bituminous spot prices in representative producing districts during the last five years and are based upon the market data regularly collected and compiled by *Coal Age*

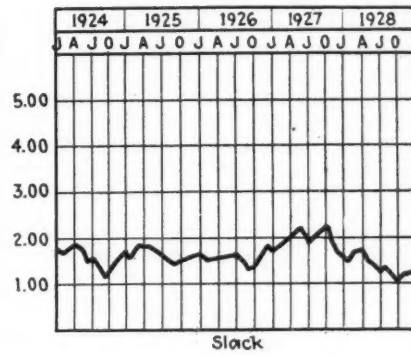




Lump

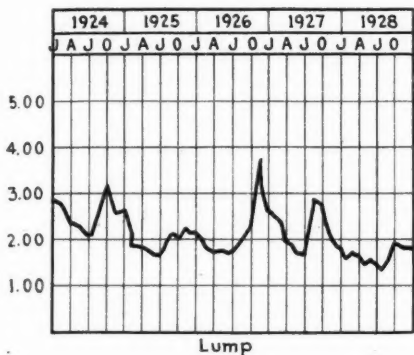


Mine Run

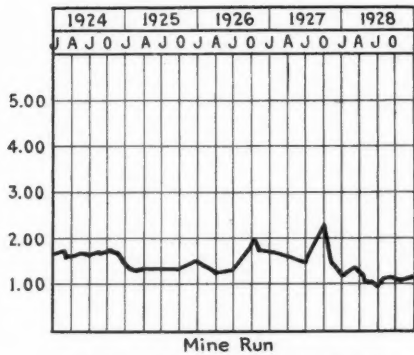


Slack

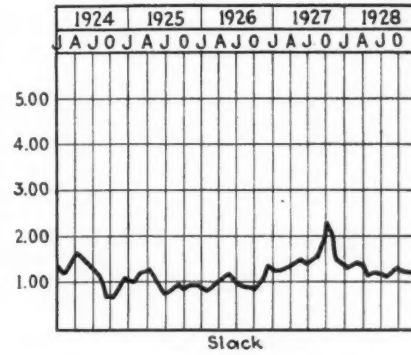
4th. and 5th. VEIN INDIANA SPOT PRICES



Lump

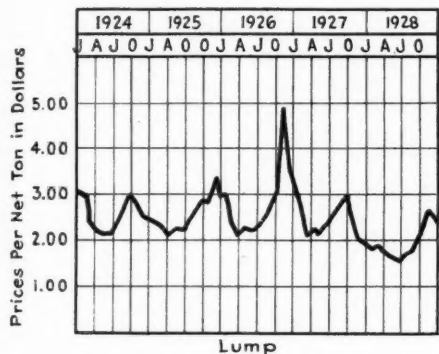


Mine Run

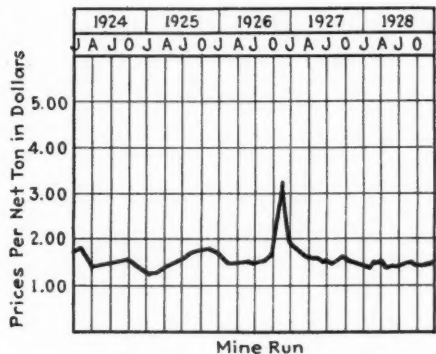


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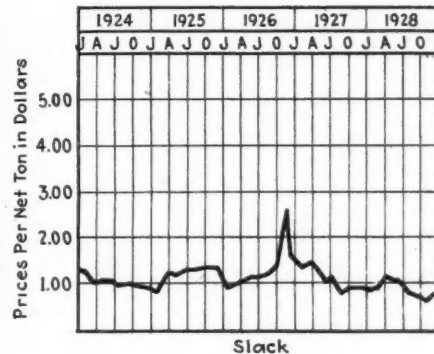
WESTERN KENTUCKY SPOT PRICES



Lump

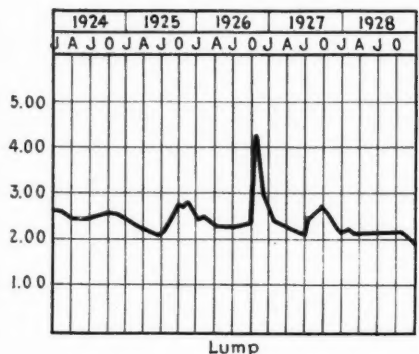


Mine Run

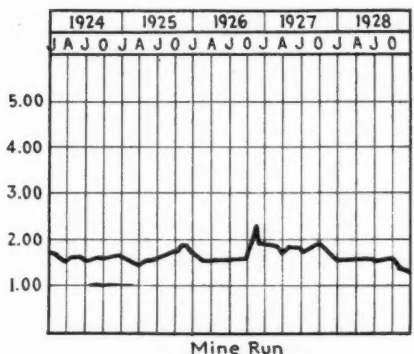


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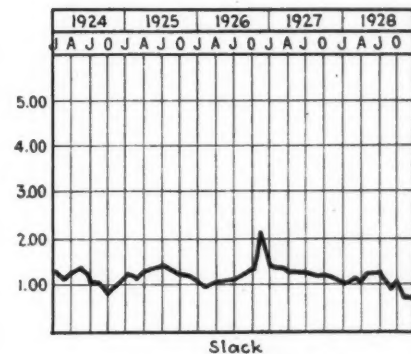
SOUTHEASTERN KENTUCKY SPOT PRICES



Lump

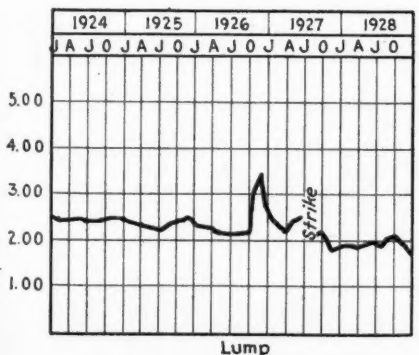


Mine Run

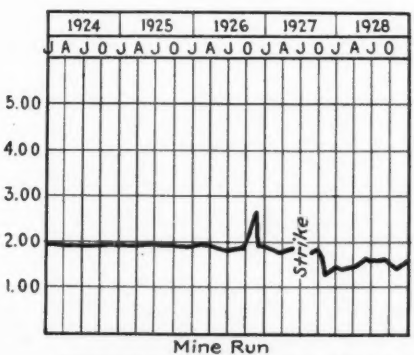


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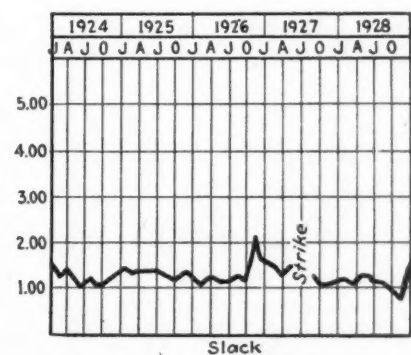
HOCKING DISTRICT SPOT PRICES



Lump

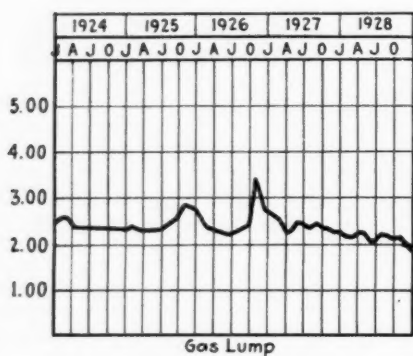


Mine Run

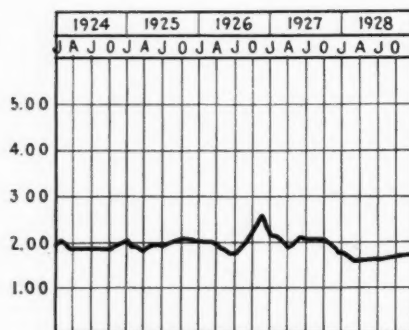


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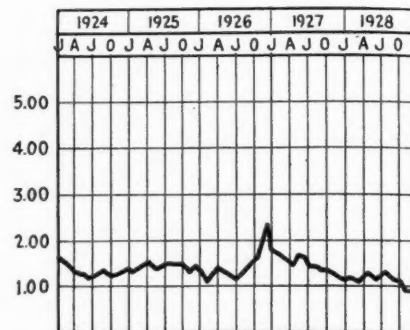
PITTSBURGH No. 8 (OHIO) SPOT PRICES



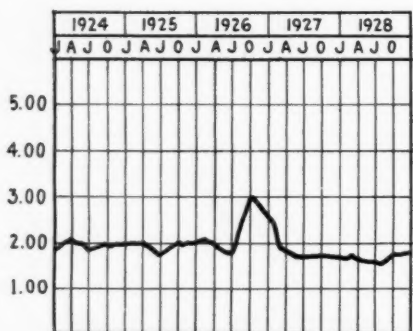
Gas Lump



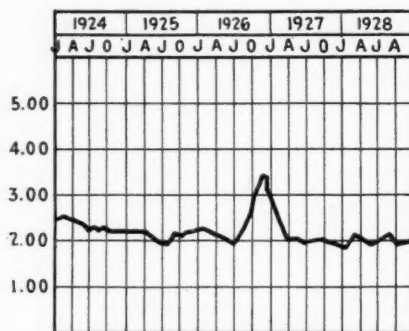
Steam Mine Run
PITTSBURGH (WEST PA.) SPOT PRICES



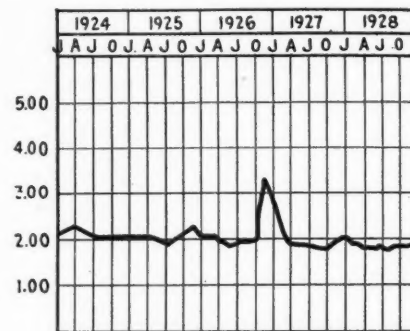
Gas Slack



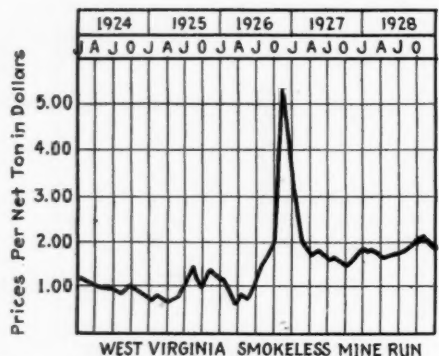
CLEARFIELD DISTRICT MINE RUN



CAMBRIA MINE RUN

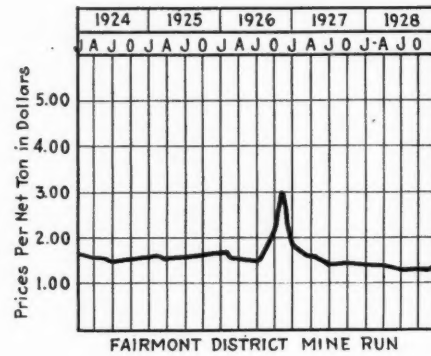


SOMERSET MINE RUN

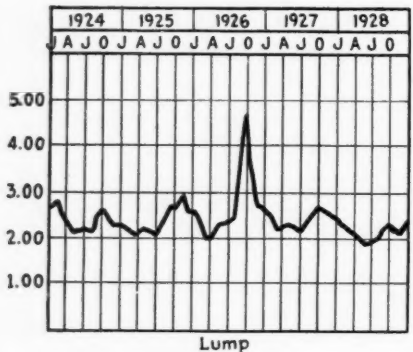


WEST VIRGINIA SMOKELESS MINE RUN

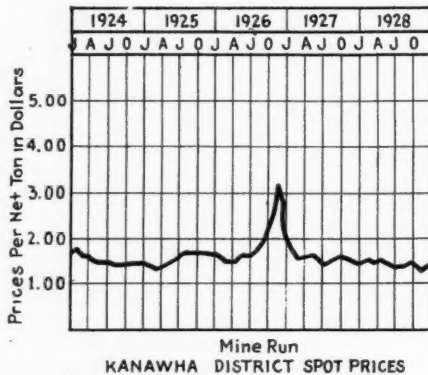
General Market Conditions
During 1928
Are Summarized
On Pages 56-59
Prices Tabulated by Months
On Page 59



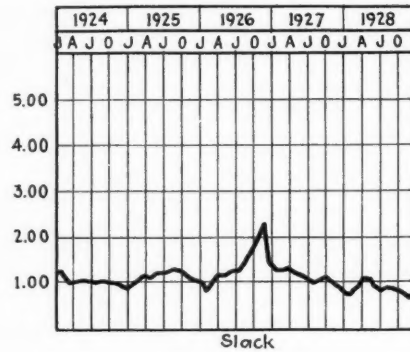
FAIRMONT DISTRICT MINE RUN



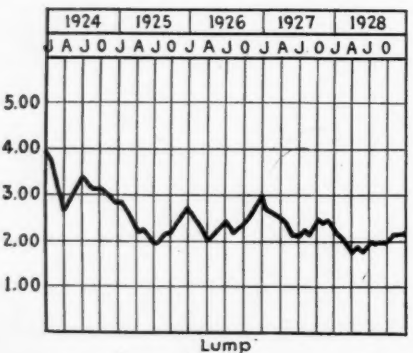
Lump



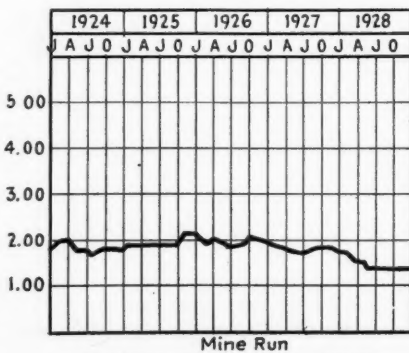
Mine Run
KANAWHA DISTRICT SPOT PRICES



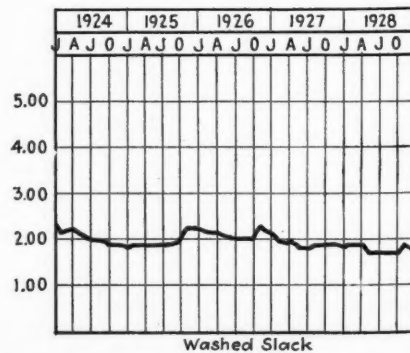
Slack



Lump



Mine Run
ALABAMA DISTRICT SPOT PRICES



Washed Slack

WORD *from the* FIELD

Industrial Stocks Recede During November

Industrial stocks of anthracite and bituminous coal in the United States and Canada on Dec. 1 had fallen off slightly from the total on the first of the preceding month, according to the monthly report of the National Association of Purchasing Agents. Reserves on hand Dec. 1 totaled 41,010,000 tons, a decline of 510,000 tons during November.

The volume of consumption as well as production receded during November, largely because of the holidays and the fact that there are fewer days in November than in October. The number of days' supply of coal on hand, however, remained the same—34.

DAYS' SUPPLY OF BITUMINOUS COAL IN VARIOUS U. S. INDUSTRIES

		Change
Byproduct coke.....	27	—1
Electric utilities and coal-gas plants..	54	...
Railroads.....	28	...
Steel mills.....	28	—1
Other industries.....	31	—4
Average total bituminous stocks in the nation.....	32	—1

ESTIMATES OF OUTPUT, CONSUMPTION AND STOCKS (In Net Tons)

	United States Production	Industrial Consumption	On Hand in Industries
November....	47,100,000	35,514,000	57,940,000
December....	47,309,000	37,225,000	55,725,000
January.....	49,645,000	37,678,000	52,909,000
February....	46,933,000	36,301,000	50,595,000
March.....	49,452,000	38,588,000	48,388,000
April.....	39,081,000	35,230,000	47,432,000
May.....	44,748,000	34,844,000	43,670,000
June.....	41,264,000	32,784,000	40,890,000
July.....	41,785,000	33,527,000	40,700,000
August.....	48,598,000	33,890,000	39,415,000
September....	48,332,000	34,223,000	40,090,000
October.....	58,914,000	36,500,000	40,778,000
November....	53,498,000	35,879,000	41,520,000
Dec. 1.....			41,010,000

Stresses Human Element In Safety Study

The relation of the human factor to the design of machinery was the theme of the monthly luncheon of the Metropolitan Chapter, American Society of Safety Engineers, held at the Fraternity Club, New York City, Dec. 20. Following the luncheon Ernest Hartford, chairman of the society, introduced C. P. Tolman, consulting engineer, New York City, and past president, National Safety Council, who spoke on "Research Technique and the Safety Program."

Calling upon the society to realize that there are still some things in the safety field requiring attention, Mr. Tolman said that accidents should not be allowed to control future safety activities. Continuing, he stated that all accidents reflect the human element and



COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 *Colliery Engineer*, with which *Mines and Minerals* previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During seventeen years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Lesher and John M. Carmody. The editorial staff of COAL AGE consists of: Sydney A. Hale, R. Dawson Hall, J. H. Edwards, Louis C. McCarthy, Ivan A. Given and A. F. Brosky.

it should therefore be considered in the design of tools, and that the mechanical part should not receive all the attention while fatigue, acuity of vision and exposure to hazards on the part of the worker were disregarded. The discussion following the paper brought out the advisability of collecting statistics on the human factor for use in machine design.

Central Pennsylvania Miners Offer to Take Cut

A new wage scale providing for reductions varying from 15 to 25 per cent from the Jacksonville scale was offered to operators in the central Pennsylvania field late in December by district officials of the United Mine Workers. James Mark, president of district 2, asserts that operators with an annual output of 3,000,000 tons have accepted the new pact. According to the operators, less than a million tons is represented by signatories to the agreement.

Provision is made in the new compact for the arbitration of all disputes with the producers and the miners are required to remain at work pending the decision of the arbitration board, which is to be final.

To Amend Pillar Legislation In Pennsylvania

When the Legislature reconvenes at Harrisburg, Pa., next week it will receive a report from the Bituminous Coal Barrier Pillars Commission, created by the 1927 Legislature and appointed by Governor Fisher. The commission has completed its survey and public hearings and will report that a natural barrier of 90 ft. for a working 500 ft. under the surface is sufficient between boundaries of adjoining coal properties. Under the present laws of Pennsylvania the barriers have been 300 to 400 ft. in thickness.

The commission estimates that the amount of coal saved under the proposed provisions, which have been incorporated into an amendment to be made in the existing act, will be 262,000 tons to each mile of boundary line. The new bill provides that the minimum pillar shall be not less than 20 ft. plus four times the thickness of the coal bed, plus 10 ft. for each 100 ft. or fraction thereof of cover at the boundary line in question. One-half of the pillar is to be on each side of the boundary line.

Coal River Collieries Sold?

Frank Taplin was reported on Jan. 7 to have purchased the Coal River Collieries Co., the Brotherhood of Locomotive Engineers mining venture which went through a receivership. The mines are located at Prestonsburg, Ky., and at Rumble and Seth, W. Va. This company received much publicity several years ago when its union owners changed the operation of its West Virginia mines to a non-union basis.

Asked by *Coal Age* to comment on the report, Mr. Taplin said: "We have become interested in the Collieries properties and have the sales agency thereof."

Funds for Connellsville Road

Funds for the first unit of construction by the Pittsburgh & West Virginia Ry. of the so-called Connellsville extension, from Cochran's Mill to Connellsville, Pa., will be provided by the issuance of \$3,000,000 of first mortgage 4.5 per cent gold bonds, which has been authorized by the Interstate Commerce Commission. The bonds, which are to be sold at not less than 94.5, have been provisionally awarded to Brown Brothers & Co. at that figure. The Commission deferred action on a petition for authority to issue \$7,000,000 in bonds as the work progressed.

Coal Mining Institute of America Studies Face and Surface Problems

GEORGE H. ASHLEY, State Geologist, Harrisburg, Pa., smilingly voiced a sad prognostication for the coal industry at the meeting of the Coal Mining Institute of America in Pittsburgh, Dec. 12-14. He said that the tonnage produced might drop 137,000,000 tons in the next ten years if some means were not taken to head off the trends with which the industry was confronted. Old well-established curves of geometrically increasing prosperity have taken new and unexpected turns. New ill-established trends of adversity, which Dr. Ashley seemed quite ready to admit had run hardly long enough to establish a definite future, have succeeded them. Some of the disturbing elements, as Dr. Ashley recognized, are of a type that promises their own extinguishment with the passage of time, but what will happen meanwhile? That was Dr. Ashley's question.

The year 1928 has brought prosperity to the Coal Mining Institute of America, its bank balance being \$1,861.38 and the number of members having increased by 690 from 3,325 to 4,015, of which the president obtained 332 personally. During the year, however, 36 died, reducing the number.

As the result of an invitation of Charles M. Schwab the members expressed a desire that the executive committee arrange for a summer meeting at Ebensburg, Pa., at the time of the annual fair and machinery exposition.

The report of the election showed that William Nisbet, chief mine inspector, Keystone Coal & Coke Co., Greensburg, Pa., had been chosen for president, G. S. McCaa, mining engineer, U. S. Bureau of Mines, Pittsburgh, Pa.; R. M. Lambie, chief, Department of Mines, Charleston, W. Va.; T. S. Lowther, state mine inspector, Indiana, Pa., were elected vice-presidents and H. D. Mason, mining engineer, Ebensburg, Pa., secretary-treasurer. W. Boncer, R. C. Beerbower, N. Evans, S. S. Hall, W. H. Howarth, E. A. Holbrook, T. Jarrett, C. L. Lutton, F. Stover and E. W. Wilkinson were named managing directors.

A brief account of the Champion coal-cleaning plant was given by J. B. Morrow, research engineer, Pittsburgh Coal Co., who said that only on Nov. 26 had the large-coal Rhéolaveur washing units been put in operation and that it was still too early to record the results. The fine-coal washer had been running longer and giving satisfaction.

W. W. Adams, U. S. Bureau of Mines, Washington, D. C., described the national safety competition for five trophies presented by N. S. Greensfelder, editor, *Explosives Engineer*. In these competitions 300 mines and quarries had taken part representing 30 out of the 48 states. In the present year's competition 322 plants were entered.

At the afternoon session W. H. Glasgow, Secretary of Mines, Harrisburg, Pa., said that the new electrical mine inspectors appointed by his department were doing good work. They are not expected to examine all electrical equipment, but only such as is portable and is in gaseous mines. It is generally understood that they are there to help the operator in his safety problem. Forty additional mines have been rock-dusted; 144 mines out of 2,000 are thus treated, which does not seem many, but when it is stated that they represent 53,000,000 tons of annual production out of the 73,000,000 tons produced from gaseous mines, or 75 per cent, it does not seem so low a proportion after all, especially as the work is all voluntary. The inspectors have no authority to compel the use of rock dust.

A NEW bill is being introduced requiring rockdusting in all dry and dusty mines. Mr. Glasgow said his department wanted gassy and non-gassy mines to be all alike rock-dusted.

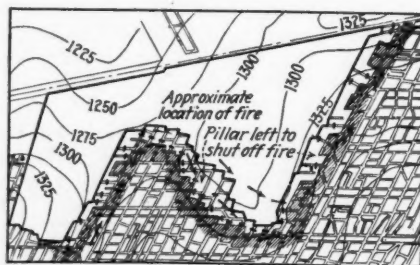
In the question-box session, over which Francis Feehan presided, Mr. Howarth declared that all motors should be in a fireproof structure and inclosed in a flameproof cover and that the fan should be placed on the intake airway.

Richard Maize, mine inspector, Uniontown, Pa., urged that not only should the blower fans be placed in a fireproof building but have an attendant at all times. He would keep such fans out of gassy mines. Prof. W. R. Chedsey, Pennsylvania State College, said that every subsidiary fan should be equipped with some means that would automatically close it down when the main fan became idle. If the main air current failed and the auxiliary fan went on working, recirculation would be inevitable and a dangerous atmosphere might be created.

In discussing the question as to the exclusive use of permissibles in bituminous coal mines, S. C. Jones, E. I. du Pont de Nemours Co., said that in damp, shallow mines that generated no gas he could not see why it should be necessary to use permissible powder which would require the use of caps, adding 2c. to the cost of each stick.

S. P. Howell, U. S. Bureau of Mines,

Fire Occurred Where a Salient Angle Caused Pressure and Grades Induced Standing Water



declared that even if it could be shown that black blasting powder could be fired without danger in shotholes, it still remained undesirable because it is so easily ignited and because it explodes so promptly on ignition. It must not be forgotten that in a tunnel where there was no gas or coal dust there was nevertheless an explosion of powder so violent as to kill 92 persons.

At the banquet in the evening Jesse K. Johnston, Greensburg, Pa., advocated the stopping of foreign immigration, especially that from Mexico as also that from Canada, as bringing Mexicans and British citizens from India and other colonies who did not intend to become naturalized. This would aid in preventing the overmanning of the coal fields. The large Mississippi flood relief works and the Boulder Dam construction might be used to supply jobs for idle miners.

John L. Clarkson, president, Illinois Power Shovel Co., Nashville, Ill., showed movie illustrations of the Conway belt shovel loader at the Sugarloaf Tunnel in Connecticut and the St. Joseph Lead Co.'s mine in Missouri. Mr. Clarkson said that to make mechanical loading a success the "chiefs must follow the machine to the face" and see that all the troubles which result from faulty planning and lack of co-operation are ironed out one by one.

"Had the production of coal," said Dr. Ashley, "continued to increase at the rate at which it increased up to 1910, the production in 1927 would have been between 1,525 million tons and over two billion tons, according to the point at which we begin to straighten the curve. One hundred years ago coal production was increasing at the rate of 500 per cent in each 10 years. From 1850 to 1910 the average gain per decade was over 100 per cent." At that rate in 1927 over 1,700 million tons should have been mined, whereas it was only 600 million.

Of the increase in coal production in the last century one-third was due to increased population and two-thirds to increased use per capita. If the old rate of increase had been maintained it would have made a difference of about 66 per cent in the present demand for coal. If the rate of growth between 1910 and 1920 continued to the present, our population will be found to be 18 per cent below what it would have been if the figures for 1910 had been increased according to the rate existing before 1880. The ultimate outcome Dr. Ashley announced to be as contained in the tables appearing on p. 65.

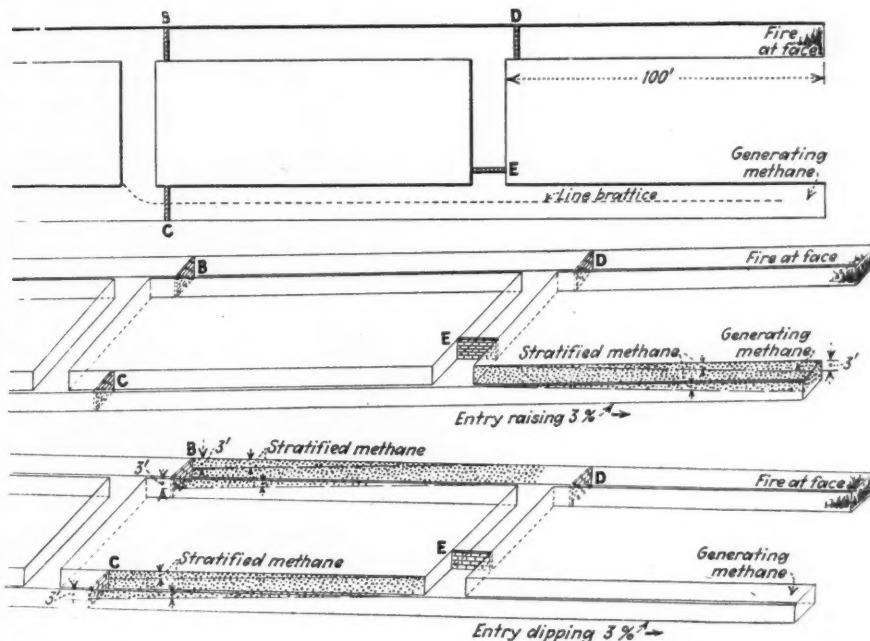
An address made by the new president ended the banquet session. At the Thursday morning session Prof. Chedsey, read a paper by A. J. Hoskin, research associate, Purdue University, on "The Spontaneous Combustion of Storage Coal." Mr. Hoskin said the water storage of coal was no longer popular. It prevented spontaneous combustion so long as the coal was completely immersed but on the emergence of any of the coal from the water the fine sizes were quite likely to catch fire. The fine coal, especially the fusain, acted in all

cases as the kindling material to ignite the lumps and it was important not to let the fine sizes in a pile become segregated from the lump as will happen if the coal is piled to any height from a given dumping point.

Mr. Maize read a paper on "Mine Fires. Including Spontaneous Combustion in Gob Sections," which included a letter from a practical coal man which stated that the moving face was not exposed to spontaneous combustion. It was the idle face that tended to catch fire and it was where water was found that fires most frequently occurred. Strange to say, some places were more subject to fires than others.

He showed a map of part of a mine (Fig. 1) where pillaring operations had at one time been going actively forward but were stopped for some time. The pillar lines were straight for long distances but the area much resembled a W with the top closed. The salient angle in the area which had falls on either side of it developed a fire. Such salient angles frequently are subject to this phenomenon. It became necessary to build 34 stoppings to shut off the fire, and this was done, commencing on the intake end and working along toward the return. The smoke made this necessary.

Mr. Maize showed by an illustration the manner in which he would shut off an entry fire. Preferably, if the fire cannot be put out by direct fighting it should be sealed at D. That may not be possible if the fire be near that point. If the heading alongside generates methane it will be desirable, if possible,



Where Should One Erect Stopping First—B, C, D or E?

to close the crosscut by a stopping at E, but it is likely that the fire will make it impossible to work at that point, for it will induce a current to flow in and out at D, carrying with it much heat and irrespirable gas. Then a stopping can be erected at B. If, however, D is not closed, A must be, and if E is not closed, C must be. Where both have to be erected, it is well to put both of them up at the same time, but that is difficult.

In discussing the rock-dusting of entries without track, J. V. Paul, U. S. Bureau of Mines, remarked that one company piped compressed air into the untracked heading through the stopping and fed the dust into the nozzle. The escape of the air distributed the rock dust, which fell on the ribs and floor for a considerable distance from the point of discharge. Mr. McVicar, Russelton, Pa., said that the loaders employed by his company sprinkled the coal ribs in the rooms within three cuts of the face. The quantity of dust used was 2½ to 3 lb. per linear foot.

At the Thursday afternoon session George S. McCaa, U. S. Bureau of Mines, in an address entitled "Some Modern Mine Rescue Data," said that apparatus had been so greatly developed that a crew went through locks into a sealed area and traveled 15,000 ft. and returned the same distance in an atmosphere that contained only 1 per cent of oxygen and had 1 to 1½ per cent of carbon monoxide. Some of the crew carried material 2,400 ft. in 80- to 100-lb. sacks and made ten trips a day, though some preferred to make only half as many trips carrying a double load. These men were carefully selected and had apparatus that was properly adjusted. These extreme journeys and labors were not recommended by the Bureau of Mines but they showed what could be done with modern equipment.

Discussing the question as to the best method of introducing self-rescuers into coal mines, Frank Dunbar, general superintendent, Hillman Coal & Coke Co., who presided, declared that he regarded the self-rescuer as essential a piece of equipment as a safety lamp.

John K. McCarthy, mine foreman, Clearfield Bituminous Coal Corporation, said that his company sold self-rescuers to its men at actual cost. The men wear them all the time they are in the mines. The company repairs them if they are injured through no fault of the owner and refunds the cost if the man leaves. The company requires that the man replace the self-rescuer with another if he injures it carelessly. There is now no difficulty in getting the men to buy them, for it has been proved in smokehouses that they are effective. On one occasion two men used their self-rescuers, and it is believed that to the use of them they owe their lives.

In discussing a question as to the placing of barricade material in the mine, Mr. Dunbar said that the Hillman Coal & Coke Co. was placing self-rescuers, a 5-gallon bottle of water, stopping tile and clay in its mines. It was necessary to keep most of these supplies somewhere, and it was best to keep it inside where it might be useful for the miners in erecting barricades and for the company in fighting fire. The company must keep it on hand in any event. The material was placed where the men could shut off a sufficient length of airway—200 or 300 ft.—because if they had less they might be asphyxiated by their own exhalations. C. W. Gibbs, general manager, Harwick Coal & Coke Co., said his company had made no such provision but had installed refuge chambers each with an 8-in. hole to the surface for forcing down air and for providing food and other supplies.

In an address on the use of the altimeter in modern mine-ventilation practice Archibald Saxe, chief engineer,

Losses in Anticipated Tonnage

George H. Ashley

Actual Savings	Tons
Public utility economies.....	50,000,000
Railroad economies.....	75,000,000
Better gas-making methods.....	19,000,000
Better coking methods.....	3,000,000
Gas made in coking.....	10,000,000
Tar burning.....	3,000,000
Domestic economies.....	10,000,000
Economies in pig iron.....	10,000,000
Industrial-plant production economies.....	105,000,000
Total.....	285,000,000
Substitutions	
Water power.....	45,000,000
Fuel oil.....	100,000,000
Gasoline.....	100,000,000
Natural gas.....	70,000,000
Total.....	315,000,000
Actual production.....	600,000,000
	1,200,000,000
Loss from failure of population to reach anticipated value, 18 per cent	216,000,000
Total loss in anticipated tonnage...	816,000,000

Anticipated Tonnage in 1937

George H. Ashley

	Tons
Gain due to increase in population estimated at 1 per cent per annum..	60,000,000
Gain due to increased use of energy (13 per cent based on the gain between 1918 and 1927 applied to the 600,000,000 tons of coal mined in 1927).	78,000,000
Total possible gain (outside of new uses).....	138,000,000
Loss due to gain in efficiency, 50 per cent on 350,000,000 tons.....	175,000,000
Loss due to increased use of water power (estimating 80 per cent increase in 10 years).....	35,000,000
Loss due to increased use of natural gas	50,000,000
Loss due to increased use of oil products	15,000,000
Total losses.....	275,000,000
Net loss in 10 years.....	137,000,000
Estimated production of coal in the United States in 1937.....	463,000,000

Ellsworth Collieries, Ellsworth, Pa., said that the altimeter would read changes in pressure as small as 0.05 water gage. The elevations have to be known, of course, and corrections made for them and office measurements have to be taken every 15 minutes so as to correct for changes in atmospheric pressure. No correction for temperatures are necessary.

On Friday, Dec. 14, a trip was made to the Champion washer to see the Rhéolaveur in action.

Trade Practice Board Named By Appalachian Men

Adoption of a motion for appointment of a trade practice committee marked a new departure in the activities of the Southern Appalachian Coal Operators' Association, which held its annual meeting at Knoxville, Tenn., Dec. 7. On the following day the annual meeting of the Southern Appalachian Efficiency Association, a mining-method and safety organization sponsored by the operators, was held.

Reports of committees at the operators' meeting indicated that the association experienced no gain or loss of membership tonnage during the past year and that receipts exceeded expenditures. It was C. B. Huntress of the National Coal Association who brought the necessity for a trade-practice committee before the meeting. In a short talk he said the operators are naturally production-minded, but should go into a consideration of marketing questions. He also urged the operators to take offensive action in regard to mining legislation instead of remaining on the defensive.

The question of inroads of water power in Tennessee was discussed. In this regard J. H. Edwards, associate editor of *Coal Age*, said that taking the country as a whole the indications are that water power probably will not increase as fast as will steam power.

V. N. Hacker, president of the Pruden Coal & Coke Co., was re-elected president of the operators' association. Other officers are C. M. Moore, president, Moore Coal Co., first vice-president; C. W. Rhodes, vice-president, Fork Ridge Coal & Coke Co., second vice-president, and R. E. Howe, secretary-treasurer.

The executive committee is composed of R. C. Scott, Grays Knob, Ky.; J. E. Butler, Stearns, Ky.; W. R. Peck, Coal Creek, Tenn.; R. M. Reams, Middlesboro, Ky.; George R. Wood, Pineville, Ky.; J. B. Gatliff, Williamsburg, Ky.; and R. S. Young, John L. Boyd, W. G. Polk, Alex Bonnyman, E. C. Mahan and C. W. Henderson, of Knoxville.

W. B. Cross, foreman of the Pruden Coal & Coke Co., was given \$25 in gold as winner of a contest for the best essay on how to prevent mine accidents.

At the annual meeting of the efficiency association on the following day Mr. Cross was elected president. At this meeting John W. Howe, general superintendent of the Block Coal &



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James A. Gorman

Coke Co. and associated companies, and retiring president of the association, presided. Speakers were J. J. Forbes, of the U. S. Bureau of Mines, Pittsburgh, Pa.; Gordon MacVean, of the Mine Safety Appliances Co.; C. B. Huntress, E. R. Clayton, secretary, Harlan County Coal Operators' Association; James Arneson, superintendent industrial education for Tennessee; John Daniel, chief mine inspector, Kentucky, and J. H. Edwards.

In his comprehensive paper "Mine Ventilation," Mr. Forbes detailed in practical terms the best practices in mine ventilation, chiefly from the standpoint of preventing gas ignitions. "Inadequate ventilation is the primary cause of all ignitions," and "there are few mines where methane cannot be detected," were his reasons for stressing the gas-dilution features of ventilation.

Mr. Huntress pointed out that all of the recent explosions which have been caused by electrical ignitions of gas have been in mines using closed lights. "I am afraid the value of closed lights has been greatly nullified by carelessness induced by their use," were his conclusions.

W. B. Wilson, of the Cambria Coal Mining Co., was elected vice-president. The new executive committee are: John W. Howe; T. D. Richards, superintendent, Red Ash Coal Co., and M. J. Sharp, foreman, Black Diamond Collieries.

Union Officials Lose in Iowa

The resident officers of the Iowa Miners' Union were defeated in the election held by the miners of that state Dec. 11, 1928. J. D. Smith, Des Moines, succeeds Joe Morris as president; Tom McCully, Des Moines, was elected vice-president, and Alf Hjort, secretary-treasurer, succeeding E. J. Morgan and John Gay respectively. D. H. Watkins, Iowa representative on the international executive board, was defeated by Neal Crook.

Gorman Succeeds Neill As Anthracite Umpire

James A. Gorman, of Hazleton, Pa., was appointed umpire of the Anthracite Board of Conciliation on Dec. 20, succeeding Charles P. Neill, who resigned earlier the same day. Mr. Neill presented his resignation at a meeting of the Board in Philadelphia. Later a petition signed by every member of the Board, asking that Mr. Gorman be named, was presented to President Judge Joseph Buffington of the Third Judicial District of Pennsylvania. Mr. Gorman, who for many years has been secretary of the Board, assumed his new duties Jan. 1.

The petition asking for the appointment of Mr. Gorman was signed by John Boylan, president, District No. 1, United Mine Workers; Michael Hartnedy, president, District No. 7; C. J. Golden, president, District No. 9; W. W. Inglis, president, Glen Alden Coal Co.; J. B. Warriner, Lehigh Coal & Navigation Co., and George B. Hadesty, Philadelphia & Reading Coal & Iron Co.

The Anthracite Conciliation Board was created by the commission appointed by late President Theodore Roosevelt to adjust the 1902 strike. In 1903 the Board started to function and Mr. Gorman was appointed a stenographer. The next year he became assistant secretary and more than twenty years ago was elected secretary.

Mr. Neill was first appointed umpire in 1907, but in 1914 he resigned because of pressure of other business. A short time later Mr. Neill returned to the Board and served up until Mr. Gorman took the reins.

Personal Notes

ERNEST I. LEWIS was elected chairman of the Interstate Commerce Commission on Dec. 26, being the unanimous choice of the other commissioners.

J. MURRAY RIDDELL, formerly general superintendent of the Kentucky coal mines of the Corrigan, McKinney Steel Co., mining engineer, is now associated with Crowell & Murray, Inc., consulting mining engineers, Perry-Payne Building, Cleveland, Ohio.

CLYDE B. AITCHISON, nominated by President Coolidge for another term as a member of the Interstate Commerce Commission, probably will be approved, as opposition to his reappointment by the Senate has virtually died down.

CYRUS S. EATON, Frank H. Hobson and George H. Howard have been elected directors of the Lehigh Coal & Navigation Co. They succeeded William P. Gest, James F. Sullivan and Walter C. Janney, who resigned.

ABRAM F. MYERS tendered his resignation to President Coolidge as a member of the Federal Trade Commission on Dec. 20. Mr. Myers had only recently become chairman of the Commission. He will serve with the motion-picture industry in a legal capacity.

Washington Letter

BY PAUL WOOTON
Special Correspondent

AS 1929 begins the attention of the bituminous industry is turning to the probable demand for coal during the year. Judging from past experience, consumption in the United States, exclusive of exports, is likely to be somewhere between 500,000,000 tons and 510,000,000 tons. Consumption is not likely to reach the 532,000,000 tons attained in 1926, because in that year a considerable quantity of bituminous coal was required to replace anthracite during the strike. Requirements for coal during 1929 are more likely to be in about the same volume as they were in 1927, when consumption aggregated 499,000,000 tons, or in 1928, when consumption apparently was slightly less than that figure.

All attempts to study the trend of demand will be facilitated by considering the requirements for particular purposes. Consumption for some purposes is increasing, while that for other purposes has been standing still, or even decreasing. In general, the industries that use fuel chiefly for the generation of power show a tendency to get along with less, while those using it for the application of heat are using more.

For instance, there are 22 large coal-consuming industries, of which cotton textiles is typical, that use coal chiefly for power. In 1909 these "power" industries consumed 16,700,000 tons. During the following ten years consumption increased, rising to 19,100,000 tons in 1919. Since the war, however, with the rapid substitution of electric power from central stations, their requirements have fallen to less than 15,000,000 tons.

On the other hand, a group of 32 "heat" industries—those using fuel primarily for the direct application of heat, like the burning of cement—have kept on increasing the amount of coal consumed. Their requirements have risen from 41,000,000 tons in 1909 to 54,000,000 tons in 1919, and to 60,000,000 tons at present.

Taking all manufacturing industries, the economies effected in the power group have offset the advances in the heat group, so that the aggregate consumption in manufacturing is practically the same today as it was ten years ago, although the production of manufactured goods has increased 30 per cent in volume in the meantime.

Turning to the railroads, which use 28 per cent of the bituminous output, it is found that an actual reduction has taken place in the quantity consumed. Ten years ago the railroads required 140,000,000 tons for locomotive fuel. Today they get along with 120,000,000 tons. A small amount of this decrease in coal consumed is due to the use of fuel oil, but most of it is represented by higher fuel efficiency. Railroad traffic has increased in the meantime.

New Permissible Plate By Bureau of Mines

One approval of permissible mining equipment was issued by the U. S. Bureau of Mines during December, as follows:

(1) Deming "Oil-Rite" mine pump; General Electric 5-hp. motor and control; 250 volt, d.c.; approval 163, General Electric Co., Dec. 7, 1928.

The railroads are handling 9 per cent more business and are burning 14 per cent less bituminous coal.

The iron and steel industry also shows an actual decline in the consumption of coal. Here the economy centers around the substitution of the byproduct coke oven for the beehive oven. Furnace men now require less coke to smelt a ton of pig iron and less coal is required to make a ton of coke. In addition, the volatile products formerly wasted in the beehive ovens now are used for fuel. Before the war the coal equivalent of the byproduct of coking amounted to 2,000,000 tons a year. Now it amounts to 16,000,000 tons. It is the 14,000,000 tons difference that is responsible for a net decrease in the steel industry's requirements for raw coal.

The electric utilities are using more coal. Twenty years ago they required 20,000,000 tons. At present they are using 42,000,000 tons. The increase is not as great as it would have been had there been no economies effected in the use of fuel, but there is an increase and it goes to offset some of the losses in other directions.

There also is an increase in consumption for domestic and other heating. The population increases as does the per capita consumption of coal for that purpose. The standards of comfort in American homes are rising. In addition, the people spend more time outside the home where heat also must be furnished. More children go to school. School terms are longer. More women work outside of the home. People spend more time in places of amusement. All of this adds to the heating load and to the per capita consumption of coal for these purposes. The increase, which includes anthracite, amounts to 15 per cent in the last twenty years. Most of this increase, however, has gone to bituminous coal.

Coming Meetings

American Wood Preservers' Association; annual meeting, Jan. 22-24, 1929, at Louisville, Ky.

Philadelphia Coal Club; twelfth annual banquet, Jan. 24, evening, at Bellevue-Stratford Hotel.

American Institute of Electrical Engineers; annual winter convention, Jan. 28-Feb. 1, 1929, at 29 West 39th St., New York City.

Midwest Power Conference and Exhibition, Feb. 12-16, 1929, at Chicago, Ill.

American Institute of Mining and Metallurgical Engineers; annual meeting, Feb. 18-22, 1929, at Engineering Societies Building, 29 West 39th St., New York City.

Instruction at Nominal Cost For Kentucky Miners

Practical instruction in mining for men in the mines in the State of Kentucky is offered in a correspondence course designed primarily for miners who wish to prepare themselves in the technical aspects of the industry, mine foremen and superintendents. The course covers the subjects of mine ventilation, drainage, mine gases, safety lamps and gas testing, mine fires and miscellaneous dangers, safety, first aid and mine rescue. Three hundred men have enrolled to take the course in 1929.

The course was originally prepared by the late Prof. C. J. Norwood, twenty-five years head of the Department of Mines and Metallurgy, University of Kentucky, formerly Chief Inspector of Mines and actively engaged in mining for over 30 years. It was then revised by his successor, the late Prof. T. J. Barr, and again revised by P. C. Emrath of the Department of Mines of the university. The course is now given under the direction of Wellington Patrick, director, Department of University Extension, and D. Collier Johnston, field representative.

The purpose in offering the course is to improve the status of miners, mine foremen and superintendents and give them such practical information as can be included in such a course. To insure its adaptability and understandability it is written in simple language and is as non-technical as possible, so that the man with a meager education may profit by taking it. The amount of mathematics, chemistry or physics involved has been made as practical and simple as possible. Thus the 64,000 miners in the State of Kentucky may avail themselves of the opportunities made possible by education at only a nominal fee. (The charge for the entire course is \$15.)

Friends Honor Jack Ryan

Twenty-four representatives of the bituminous coal industry gave a dinner Dec. 13, at the Pittsburgh Athletic Association Club, Pittsburgh, Pa., in honor of John T. Ryan, general manager of the Mine Safety Appliances Co., who recently married Miss Mary Gavin, of Salt Lake City. After the dinner and toasts Mr. Ryan was presented with a beautiful clock which bears the inscription, "Dear Jack, a friend for each half hour of the day," together with the names of those present.

Frank B. Dunbar, of the Hillman Coal & Coke Co., presided and the following attended: Thomas Moses, D. D. Dodge, W. C. Hood, C. M. Lingle, Thomas Fear, Wm. German, W. G. Duncan, R. M. Lambie, W. H. Glasgow, W. L. Affelder, Thomas Dawson, Rush N. Hosler, George McCaa, George Osler, L. E. Young, Edward Steidle, C. W. Gibbs, F. C. Thomas, E. A. Holbrook, Archibald Saxe, A. P. Cameron, E. J. Newbaker, John A. Oartel and George Loughran.

Mine Fatalities in November Recede From October and Year Ago

COAL-MINE fatalities in the United States in November, 1928, numbered 166, according to information furnished by state mine inspectors to the U. S. Bureau of Mines. One hundred and thirty-two of these fatalities occurred in bituminous mines in various states, and the remaining 34 were in the anthracite mines of Pennsylvania.

The total production of coal for November was 53,498,000 tons. Based on this figure the fatality rate was 3.10 per million tons for the entire industry, while for bituminous mines alone, based on an output of 46,041,000 tons, the rate was 2.87. The anthracite rate was 4.56, based on a production of 7,457,000 tons. The corresponding figures for November, 1927, were 3.21 for bituminous mines, based on 40,468,000 tons and 130 deaths; 5.98 for anthracite mines, with 41 deaths and 6,854,000 tons, and 3.61, based on a total production of 47,322,000 tons and 171 fatalities.

It will thus be seen that the report for November, 1928, represented an improvement over November, 1927, both as to the whole industry and for bituminous and anthracite separately. The November record also was better than that for October, 1928, which showed a fatality rate of 3.19 for the entire industry and 2.90 for bituminous alone and 4.91 for anthracite.

For the eleven-month period, January to November of the present year, a loss of 1,989 lives in the coal-mining industry has been recorded, which is 83 less

than for the same period of 1927. It is probable that final returns will increase the 1928 figure slightly, but the eleven-month fatality rate, based upon reports to date, is 3.83 as compared with 3.76 for the same period in 1927. Of the deaths thus far reported in 1928, 1,579 were in bituminous mines and 410 at anthracite mines. The fatality rates per million tons were 3.51 for bituminous and 5.81 for anthracite based on a production of 449,375,000 tons and 70,508,000 tons respectively.

One major disaster—that is one causing the loss of five or more lives—occurred on Nov. 30 at Roderfield, W. Va., when an explosion caused the death of 6 men. This accident brings the total number of major disasters from January to November, 1928, to 13, with a resulting loss of 320 lives, as compared with 8 for the same period of 1927, with a loss of 155 lives. Fatality rates based exclusively on these figures were 0.616 for 1928 and 0.281 for 1927.

A comparison of the accident record for the eleven-month period, January to November of 1928, with that of the same period of 1927 is shown in the following table:

	Year 1927	Jan.-Nov. 1927	Jan.-Nov. 1928
All causes.....	3,732	3,762	3,826
Falls of roof and coal..	1,922	1,932	1,870
Haulage.....	.594	.594	.614
Gas or dust explosions:			
Local explosions.....	.154	.147	.088
Major.....	.259	.268	.616
Explosives.....	.184	.182	.121
Electricity.....	.167	.176	.160
Other causes.....	.452	.463	.357

Blotter Ads Take

What kind of advertising matter is preferred by anthracite dealers is fairly well indicated by this experience: Early in December the Cert-i-fide Anthracite Producers announced a 1929 series of blotters available to their dealers at low cost. Orders poured in totaling more than 3,000,000 blotters a week after the offer was made.

The idea originated with the dealers themselves. Several hundred hard-coal dealers throughout New England, New York and the Middle West had been consulted about the Cert-i-fide Anthracite advertising. One of the most common requests was for advertising material which the dealers themselves could use. Some suggested leaflets, others postcards, but a big majority leaned toward blotters.

Rejects Youngstown Extension

Authority to construct branches in order to establish a water and rail service between Pittsburgh, Pa., and Youngstown, Ohio, sought by the Pittsburgh, Lisbon & Western R.R., has been conditionally denied by the Interstate Commerce Commission. The case has been held open, however, for further hearing to procure evidence bearing upon the practicability of providing rail transportation between the Ohio River and the Youngstown district over existing lines.

Coal-Mine Fatalities During November, 1928, by Causes and States

(Compiled by Bureau of Mines and published by Coal Age)

State	Underground										Shaft					Surface						Total by States				
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal.	Mine cars and loco- motives.	Explosions of Gas or Coal Dust	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining Machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes	Railway cars and locomotives.	Other causes	Total.	1928	1927
Alabama.....	1		3									5													5	9
Alaska.....																									0	0
Arkansas.....																									0	0
Colorado.....	1	2										3													3	5
Illinois.....	12	2	4					1	1		1	21													21	8
Indiana.....	1											2													2	5
Iowa.....	1		1									2													2	3
Kansas.....																										0
Kentucky.....	15		3	3							1	22							1	1				2	22	14
Maryland.....																									0	0
Michigan.....																									0	1
Missouri.....																									0	1
Montana.....																									0	0
New Mexico.....	2											2													2	1
North Dakota.....																									0	0
Ohio.....	4										1	5													5	4
Oklahoma.....	1		1									3													4	4
Pennsylvania (bituminous).....	11		3		1							14							1		1			1	15	32
Tennessee.....																									0	0
Texas.....																									0	0
Utah.....	2											3													3	1
Virginia.....	1		1									1													1	3
Washington.....																									0	1
West Virginia.....	17	4	9	7	2		2		1			42										1	1	2	44	33
Wyoming.....	2											2													2	4
Total (bituminous).....	71	8	25	10	3		3	2	1			126						2	2	2	1	1	1	6	132	130
Pennsylvania (anthracite).....	20		5		1							29	1				1	2	2				1	3	132	141
Total, November, 1928.....	91	8	30	10	4		4	2	1			155	1			1	2	2	2	1	1	1	2	9	166	
Total, November, 1927.....	88	13	29	4	11		7					156	1		2		3	4	1	1	1	1	4	12		171

King Coal's Calendar for 1928

January

Jan. 2—Secretary of Labor James J. Davis issues statement suggesting that the entire soft-coal industry of the country should be placed in hands of a board of reorganization managers for not more than six years. He favors continued private ownership with a minimum of government supervision.

Jan. 3—Nearly 60 per cent of Colorado Fuel & Iron Co. coal miners in Fremont County, Colorado, petition company to reopen, foreshadowing general resumption at a basic day wage of \$6.52. This is an increase of 32c. as of Jan. 1 and \$1 a day more than was paid prior to Sept. 1.

Jan. 3—Rochester & Pittsburgh Coal & Iron Co. and Jefferson & Clearfield Coal & Iron Co., two of the largest producers in central Pennsylvania, merged at Brookville, Pa., under the name of the Rochester & Pittsburgh Coal Co.

Jan. 4—Senator Copeland of New York and Representative Jacobstein of New York, introduce "coal stabilization" bill in Congress at Washington, authorizing suspension of Sherman anti-trust law as applied to the soft-coal industry. Measure provides that coal companies may form district associations for the purpose of acting together in mining or collective marketing of soft coal in interstate commerce under supervision of Secretary of Commerce.

Jan. 4—Illinois joint wage commission convenes in Chicago to consider contentions of operators and miners' union in formulating a "competitive" wage scale to take the place of the Jacksonville agreement.

Jan. 6—Governor Vic. Donahey of Ohio, in letter to Lee Hall, Ohio district president of the United Mine Workers, and to S. H. Robbins, president of the Ohio Coal Operators' Association, suggests a meeting of miners' and operators' representatives in the State Senate Chamber Jan. 16, to discuss possible settlement of wage controversy. Mr. Hall agrees to the meeting, but Mr. Robbins declines.

Jan. 6—Mines Nos. 1 and 2 of the Bell & Zoller Coal & Mining Co., at Zeigler, Ill., smash their previous production records for one day, with 9,289 and 8,505 tons, respectively.

Jan. 9—Senator Johnson of California introduces in the Senate at Washington a resolution calling for thorough investigation of conditions in the soft-coal fields of central Pennsylvania, western Pennsylvania, West Virginia and Ohio.

Jan. 9—Explosion in mine No. 18 of the Industrial Coal Co., West Frankfort, Ill., kills 21 miners.

Jan. 9—Pittsburgh Coal Co. posts new scale at its mines in the Pittsburgh (Pa.) district calling for reductions effective the following day. The new rates range from 59c. to 87½c. per hour underground and from 51c. to 68c. outside. On some jobs there is no cut; on others the cuts range from 4c. to 8c. an hour. Though this is the second reduction since the advance of Oct. 27, 1926, the scale remains on an average above the original open-shop scale. W. J. Rainey, Hillman Coal & Coke Co., Washington Gas Coal Co. and Oliver & Snyder Steel Co. reduce wages in Connellsville field to 1917 rate of \$5 per day for inside day labor.

Jan. 12—One striking miner is killed and a law-enforcement officer and two strikers are wounded in a gun fight between I.W.W. miners and the police in Walsenburg, Colo.

Jan. 12—West Virginia, Kentucky, Tennessee and Virginia coal-producing companies—54 in all—file brief with Interstate Commerce Commission urging that 20c. reduction in rates on lake cargo coal from those states proposed by Southern railroads be permitted to become effective. Northern railroads and operators oppose cut.

Jan. 13—Mob of 250 striking miners sets upon workers at mine No. 2 of the Youghiogheny & Ohio Coal Co., Rush Run, Ohio, beating 5 and routing 51 others on their way to work.

Jan. 24—Officers of Ohio Coal Operators' Association announce intention of 165 mines in Hocking and Sunday Creek valleys to open Jan. 30 on so-called Morris plan. Wages to be on sliding scale based on market prices for coal—60 per cent to miners, 40 per cent to operators.

Jan. 25—Meeting of miners at Nelsonville, Ohio, votes not to accept less than the Jacksonville wage rate of \$7.50 per day for day labor.

Jan. 30—Purchase by a New York syndicate represented by G. M. Hinckley, of the interests of John C. Sullivan in five West Virginia coal companies for \$390,000 is second step in proposed \$3,000,000 merger of coal properties in Raleigh and Wyoming counties under name of Comago Smokeless Fuel Co. The holdings purchased are the Wood-Sullivan, Tommy Creek, Raleigh-Fire Creek, Pickshin and Meade-Pocahontas companies.

February

Feb. 1—In two-day oral argument begun before I.C.C. in lake cargo rate case Southern carriers contend that proposed reduction of 20c. per ton filed following similar cut by Northern roads would be well within the zone of reasonableness and therefore would not cause a burden on other traffic.

Feb. 1—Senator Johnson urges action on his resolution calling for an investigation of conditions in soft-coal fields of Pennsylvania and Ohio.

Feb. 2—Consolidation of Hatfield-Reliance Coal Co. and Campbell's Creek Coal Co., large coal and river transportation interests operating in West Virginia and eastern Kentucky, announced in Cincinnati, Ohio, by Irwin Davis, new president of the merged companies. The new company, to be known as the Hatfield-Campbell Creek Coal Co., to have capital of about \$8,000,000.

Feb. 2—Dominion Coal Co., Sydney, Nova Scotia, is notified that a commission will be appointed under authority of Provincial Mines Act to determine whether three of its mines in the Glace Bay and Sydney districts could be more advantageously operated. Coal is produced under lease from the province, which owns the coal beds. "Broken time," with resultant distress among the miners and their families, is the basis for the proposed inquiry.

Feb. 7—Labor leaders, including representatives of the United Mine Workers, railroad brotherhoods and the American Federation of Labor, launch plans in Washington to carry fight to Congress against alleged abuse of injunctions in labor disputes.

Feb. 8—Conference of Illinois operators and miners' union representatives adjourns sine die when miners reject proposal of unbiased arbitration and a reduction in wages together with improvement in the working agreement for the operators.

Feb. 8-9—Operators controlling over three-fourths of coal output of northern West Virginia take preliminary steps toward merging companies at meeting in Fairmont.

Feb. 9—Senator Joseph T. Robinson introduces resolution, which is passed by the Senate, instructing the Interstate Commerce Commission to submit to Congress previous rate decisions that were influenced by competitive conditions between districts.

Feb. 9—Governor Donahey of Ohio says he will send National Guard to soft-coal fields of eastern Ohio unless there is a cessation of activities by alleged Communists. Federal Judge Hough announces that he will instruct

U. S. Marshal and deputies to maintain order at mines covered by injunctions, following riot by mob of 200 at Florence mine of Youghiogheny & Ohio Coal Co., St. Clairsville, Belmont County.

Feb. 13—Bureau of Mines report on consumers' stocks of bituminous coal shows reserves of 55,500,000 net tons as of Jan. 1. At current rate of consumption this represents 44 days' supply.

Feb. 16—Senate passes Johnson resolution directing Senate committee on interstate commerce to investigate coal strike conditions in Pennsylvania, West Virginia and Ohio. Proposal of Senator Reed of Pennsylvania that inquiry into freight rates be included is rejected.

Feb. 16—Citing conditions in the western Pennsylvania coal fields, William Green, president, A. F. of L., urges favorable action before Senate judiciary committee on bill introduced by Senator Shipstead of Minnesota to restrict federal courts in the issuance of injunctions in labor disputes.

Feb. 17—More than 2,000 miners in Iowa and the vicinity of Lexington, Mo., form new union to be known as the Southwest Miners' Association of America, an amalgamation of the United Brotherhood of Miners of Southern Iowa and the Independent Miners of Lexington, Mo. The leaders of the new union are James P. Agnessen, president of the old United Brotherhood, and Arch Helm, formerly president of the Missouri United Mine Workers. Newly formed organization and 20 operators agree to new scale of \$6 to \$6.50 for day labor.

Feb. 19—Colorado miners vote 9 to 1 to return to work, ending strike called Oct. 18, 1927, by I.W.W. This action was urged by I.W.W. leaders following completion of hearing by State Industrial Commission regarding strike conditions and miners' wages in Colorado.

Feb. 20—Kinloch mine of Valley Camp Coal Co., at New Kensington, Pa., is scene of explosion which takes 12 lives.

Feb. 20-23—Seventy-one separate events, including 47 purely technical sessions, held at 136th meeting of the American Institute of Mining and Metallurgical Engineers, in New York City. Sessions held on coal and coal products, stabilization of the industry and engineering education, the crowning feature being the address of the Secretary of Commerce, Herbert Hoover, recipient of the William Laurence Saunders medal.

Feb. 23—Senate subcommittee named to investigate conditions in strike zone arrive in Pittsburgh and start tour of mining communities.

Feb. 24—Indiana union miners and operators conclude two-day meeting at Terre Haute without reaching understanding on wage scale to go into effect April 1.

Feb. 24—Thirteen miners killed by an explosion in No. 18 mine of the Mama Coal Co., Jenny Lind, Ark.

Feb. 25—Authority to reduce rates from Southern fields to the lakes denied the railroads by I.C.C.

Feb. 27—H. T. Wilson resigns presidency of Red Jacket Consolidated Coal & Coke Co., Columbus, Ohio.

Feb. 27-29—East meets West at winter meeting of Rocky Mountain Coal Mining Institute, held in Denver, Colo., where economic aspects of the industry as well as mining methods are discussed.

Feb. 28—Six non-union miners and three guards of Dorothy mine of Youghiogheny & Ohio Coal Co., at Glen Robbins, Ohio, seriously beaten by alleged union sympathizers.

March

March 1—Freight rates on coal from all Illinois mines to Chicago reduced 5c. per ton in order by Illinois Commerce Commission effective April 14.

King Coal's Calendar for 1928

March 1—William Emery, Jr., for many years resident engineer for Madeira, Hill & Co. collieries, in Pennsylvania, assumes presidency of the Cambridge Collieries Co.

March 4—Eviction of miners from more than 300 company-owned houses in Belmont and Harrison counties, Ohio, asked in petition filed in U. S. District Court by four large producers.

March 5—Bertha Consumers Co., Pittsburgh, Pa., placed in hands of receivers as result of threat of suit by another Pittsburgh coal company to collect a debt owed it by the Bertha Consumers Co. John H. Jones, president, and Fred E. Powers, a director, named receivers, place liabilities at \$2,400,000 and assets over \$7,500,000.

March 5—About 1,500 union miners and sympathizers march on Wolf Run mine of Warner Collieries Co., at Amsterdam, Ohio, but there are no casualties. Plant is operating non-union under protection of a federal court injunction.

March 6—By a vote of 10 to 7 the Senate interstate commerce committee reports unfavorably on confirming reappointment of John J. Esch as member of Interstate Commerce Commission. Opposition comes principally from Senators from Southern coal-producing states, because of Commissioner Esch's switching his vote to favor Northern producing fields in lake cargo case.

March 7—Senate committee begins general hearing at Washington on conditions in soft-coal fields of Pennsylvania, West Virginia and Ohio, with John L. Lewis as first of long line of witnesses, including captains of industry, coal operators, labor leaders, clergymen, newspaper reporters and railroad representatives. Hearing continues until March 30, when recess is taken until April 9.

March 8—Two fan houses dynamited at Woodvale mines, owned by Rockhill Coal & Iron Co., operating in the Broad Top (Pa.) field, causing \$9,000 damage.

March 17—Making of individual contracts or assignment of more than one chamber to one miner does not violate existing agreements between anthracite operators and the miners' union, Charles F. Neill, umpire of Anthracite Conciliation Board, decides in case filed against Hudson Coal Co.

March 20—Report by Colorado Industrial Commission says absence of an organization of their choice, which could treat with operators for correction of grievances, caused miners to accept leadership of I.W.W., which is blamed for strike in Colorado coal fields in autumn of 1927. Operators, however, are held responsible for conditions which forced the miners to follow I.W.W.

March 22—Change in policy in negotiation of wage contracts adopted at meeting of Indiana Bituminous Coal Operators' Association. Resolution adopted provides that no further negotiations will be made as an organization with the miners but any operator is free to agree to any scale obtainable.

March 28—Illinois operators definitely break with United Mine Workers. Meeting of Coal Operators' Association of Illinois unanimously decides to cease further joint bargaining for wage scale between any organized group of producers and the union. Strip-mine operators in Indiana field renew truce contract until March 31, 1929.

March 29—Judge Benson W. Hough of the U. S. District Court at Columbus, Ohio, issues eviction orders against 285 striking miners and their families in eastern Ohio, giving them until May 1 to vacate coal-company houses which they have been occupying since April 1, 1927, when the men went on strike.

March 31—I.C.C. decision in Eastern bituminous rate case grants Northern operators 13c. reduction to Baltimore for transshipment by water inside the capes, a 15c. cut to most all-rail destinations in New England where the rate exceeds \$3.72 per gross ton and minor adjustments to points nearer the mines. Tariffs put in effect on domestic sizes

of Southern low-volatile coal to points in New England during 1925 anthracite strike extended to include mine-run and slack.

April

April 1—Monongahela Coal Operators' Association reorganizes to curtail operation expenses. John H. Jones, Pittsburgh, Pa., and Delbert H. Pape resign presidency and secretaryship, respectively. J. M. G. Brown elected president.

April 1—"Save the Union" committee, headed by John Brophy, former president of district 2, United Mine Workers (central Pennsylvania), and Powers Haggood, radical, calls strike of non-union miners in central Pennsylvania for April 16.

April 2—Anthracite producers announce that they are arranging for a three-year advertising program.

April 2—Eight miners killed in explosion at Keystone Coal & Coke Co. mine, Keystone, W. Va. Coroner's jury finds blast was caused by pocket of gas liberated by fall of slate.

April 5-6—Indiana Fuel Conference, held under auspices of Purdue University, at Lafayette, Ind., attended by over two hundred persons interested in coal mining, selling and consumption.

April 8—Consolidation of Peabody and Insull coal interests whereby the Peabody Coal Co. takes control of eleven mines owned by Illinois utility companies announced in Chicago.

April 11—Clarence W. Watson retires from presidency of Consolidation Coal Co. Is succeeded by George J. Anderson, executive vice-president. Robert C. Hill, vice-president of Madeira-Hill Coal Co., elected chairman of board and of executive committee.

April 14—I.C.C. order prohibiting Southern roads from reducing rates on lake cargo coal 20c. per net ton enjoined by U. S. District Court for Southern District of West Virginia. Three days later U. S. Supreme Court refuses to stay order of lower court pending appeal. Lower rates go into effect April 20.

April 15—E. D. Logsdon, president of the Knox Consolidated Coal Co., operating in Knox County, Indiana, named receiver for the company in a friendly action to conserve its assets.

April 19—United Mine Workers of Glace Bay, Nova Scotia, accept profit-sharing contract offered by British Empire Steel Corporation carrying wage increase. By the agreement, which is for two years, effective immediately, the company will divide among the lower paid men \$300,000 made during the year over and above the total for 1927 and will divide 25 per cent of any earnings over the \$300,000 thus provided for among the entire body of miners.

April 21—Members of Coonville (Ohio) local, United Mine Workers, rescind action of five days previous, when they voted to accept 1917 wage scale and return to work at mines of Central West Coal & Lumber Co. Union officials informed the Coonville miners that they would forfeit their charter if they went to work under the 1917 scale.

April 23—Senate subcommittee named, with Senator Watson of Indiana as chairman, to consider legislative proposals for relief of bituminous coal industry, functioning to start at the close of hearings in Senate investigation.

April 23—Oral Daugherty, president of subdistrict 1, Ohio United Mine Workers, removed from office and several hundred union members who participated in "marches of protest" ordered expelled from the union at meeting of state organization.

April 24—Reduction in rates on Illinois coal moving to St. Louis ordered by Interstate Commerce Commission, effective June 28. From Belleville district \$1.04 instead of \$1.16 was prescribed, and from southern Illinois, \$1.30 instead of \$1.38.

April 26—Operations resumed at No. 6

colliery of Pennsylvania Coal Co., Pittsburgh, Pa., following five months' idleness and several killings due to factional strife in union over contract mining.

April 27—Sales representatives of anthracite producers organize co-operative body to boost sales of hard coal in New England States.

May

May 1—Winding Gulf Colliery Co. makes general reduction of 20 per cent in wages at its four mines in Winding Gulf field.

May 4—Judge C. O. Dye, in Common Pleas Court at Caldwell, eastern Ohio, grants temporary injunction to operators enjoining mass picketing. No more than three union men allowed at each picket post and the posts must be at least 700 ft. apart.

May 7—Report of Federal Council of Churches on conditions in western Pennsylvania soft-coal field urges complete unionization to alleviate "unsatisfactory economic situation."

May 7-11—Mechanization proves of outstanding interest at fifth annual convention of operating men held under auspices of American Mining Congress and exposition of coal-mine equipment staged by the manufacturers' division of the organization at Cincinnati, Ohio.

May 9—Northern Illinois members of United Mine Workers in secret ballot vote, 425 to 13, to return to work at basic wage of \$5 a day and \$1.20 a ton for diggers. New organization known as Northern Illinois Mine Workers' Union formed; signs three-year agreement with operators.

May 10—Jeddo-Highland Coal Co. and Hazle Brook Coal Co., large independent anthracite producers, merge, each retaining old operating management.

May 14-16—Need for unremitting efforts for safety stressed at annual meeting of Mine Inspectors' Institute of America, held at Lexington, Ky.

May 16—F. W. Leamy elected senior vice-president of Hudson Coal Co., succeeding William H. Williams, resigned.

May 17—Investigation of soft-coal industry by Senate committee on interstate commerce ends. Senator Watson, chairman of the committee, introduces on the following day a bill drafted by counsel for the United Mine Workers and embodying the union's ideas of proper legislative relief. The measure proposes the creation of a Bituminous Coal Commission of five members to serve as a permanent federal agency to regulate interstate commerce in soft coal, mergers, co-operative marketing and provides for licensing of producers and shippers in interstate commerce.

May 18—Northern railroads other than the Baltimore & Ohio file tariffs with I.C.C. reducing rates from Ohio and western Pennsylvania to the lakes 20c. per net ton, effective June 18. The B. & O. cuts rates from the Fairmont district 10c.

May 19—Explosion in Mather collieries of Pickands, Mather & Co., Mather Pa., results in death of 195 men. Coroner's jury declares gas and coal dust were ignited in unknown manner.

May 22—Twenty-two lives lost in disaster at mine No. 1, Yukon Pochontas Coal Co., Yukon, W. Va. Report of coroner's inquest declares that explosion was caused by a door being left open by machine men, allowing an accumulation of gas, and also by machine men failing to test for gas with safety lamp.

May 22—Explosion at mine No. 30 of the Black Mountain Coal Co., Kenvir, Ky., kills eight. Report by company says blast "was caused by three workmen blasting a large rock in the mine."

May 24—Consolidation Coal Co. announces indefinite shutdowns for some of its "least efficient mines" in program for economic rehabilitation of bituminous coal industry and invites other producers to join in the movement.

King Coal's Calendar for 1928

May 25—Ten killed in explosion at Conyngham (No. 5) colliery of Hudson Coal Co., North Wilkes-Barre, Pa. Exact cause not determined.

June

June 4—Indiana Bituminous Coal Operators' Association disbands; action said to be due to feeling that status of labor relations between operators and miners' union leaves no further need for the organization.

June 11—Organization of Coal Industry Conference, to include representatives of the operators, wholesalers, retailers, railroads and manufacturers of equipment sold to the coal industry, recommended in report of special committee of Fifteen meeting in New York City as outgrowth of discussion of proposal for a national coal week.

June 12—I.C.C. declines to suspend tariffs filed by Northern railroads providing for voluntary reduction of 20c. per ton on lake cargo coal from mines in Pennsylvania and Ohio.

June 19—Tipple and adjoining buildings of Neal Coal Co., at Littles, Ind., leased by Gibson Coal Co., completely destroyed by fire. Three days previous a court order had been issued restraining union officers and sympathizers from interfering with workers of the Gibson company.

June 19-20—Statement of position of coal trade in eastern Canada and papers on underground support of roadways, installation of underground electrical machinery, endless haulage and longwall mining are features of interest to coal men at 36th annual meeting of Mining Society of Nova Scotia, held at Halifax.

June 20—Indiana Coal Trade Association formed, with headquarters in Terre Haute, to take over work formerly conducted by traffic department of Indiana Bituminous Coal Operators' Association, dissolved.

June 20—Five miners killed and seven seriously injured by explosion in National mine of the National Fuel Co., near Morgantown, W. Va.

June 21-24—Safety, stripping operations and power costs take up major portion of proceedings of Illinois Mining Institute on annual boat trip.

June 23—Forty-four teams from various parts of the state take part in tenth annual Alabama First-Aid Contest. Winning white team, from New Castle Coal Co., has percentage of 96.4.

June 30—Notice of 11 per cent cut in wages for virtually all classes of employees except pit coal diggers posted by H. C. Frick Coke Co.

July

July 1—Richard F. Grant, long associated with the M. A. Hanna interests, resigns presidency of Susquehanna Collieries Co. to head Lehigh Valley Coal Corporation, a merging of the Lehigh Valley Coal Co. and the Lehigh Valley Coal Sales Co. James Prendergast succeeds him as head of the Susquehanna company.

July 1—Alabama coal mines go on basis of free labor exclusively in accordance with enactment of last session of Legislature prohibiting employment of convicts in the mines.

July 2—State Industrial Commission of Colorado, filing an answer in Denver District Court in suit brought by Charles Metz, secretary of the miners' executive committee, to compel the commission to make known its findings in regard to miners' wages, says hearings conducted by it did not afford a basis for reaching a satisfactory conclusion in the matter of wages.

July 2—Pittsburgh Terminal Coal Corporation reduces wages of loaders from 55c. a ton to 53c. and of cutters from 12c. to 11c. a ton.

July 2—Jonesville No. 1 mine of La Salle Carbon County Coal Co. dynamited on eve of opening with men from

newly formed Northern Illinois Mine Workers' Union.

July 5—About 7,000 mine workers employed by the Lehigh Coal & Navigation Co. in Panther Creek Valley, Pennsylvania, quit work in sympathy strike as protest against suspension of operations at 4, 5 and 6 collieries of the company as an economy measure during hard-coal slack season. Andrew Matthey, district president of the United Mine Workers, ordered the men back to work, some returning July 10 and the remainder the following day.

July 6—Executives of Northern and Southern railroads, meeting in New York City, reach understanding that they will endeavor to obtain approval of a compromise that would give the Pittsburgh field a differential of 35c. over Southern base rates on coal to lake ports for transshipment.

July 2-7—Forty-five manufacturers and jobbers serving coal industry have exhibits of equipment at Cambria County Industrial Exposition, Ebensburg, Pa. Coal and other industrial leaders make addresses at banquet.

July 9—Charles H. Dorrance elected president of Racket Brook Coal Co., vice David Boies, deceased.

July 16—Charleroi mine of Youghiogheny & Ohio Coal Co., in Washington County, Pa., reopens on open-shop basis after being idle a year and a half.

July 16—J. T. Dunigan, president, and U. S. Marshal Seigel Workman continued as permanent receivers of Coal River Collieries Co. in bankruptcy proceedings at Charleston, W. Va.

July 18—United Mine Workers abandons Jacksonville scale as basis for wage negotiations, authorizing district organizations of the union to attempt to make agreements with operators in their territory "upon a basis mutually satisfactory." Decision follows several days' session of international policy committee at Indianapolis, Ind., called by John L. Lewis.

July 18—Rinaldo Cappellini resigns presidency of district 1, United Mine Workers. John Boylan, of North Scranton, chosen as his successor.

July 19—Fire destroys breaker and other buildings of Superior Anthracite Coal Co. at Carbondale, Pa.

July 21—John C. Brydon appointed general superintendent Pennsylvania Coal Co., Hillside Coal & Iron Co. and Blossburg Coal Co., succeeding Joseph Jennings, resigned.

July 23—Horace F. Baker resigns as president and chairman of the board of the Pittsburgh Terminal Coal Corporation. G. Faber Downey, Jr., assumes office as acting president.

July 25—Seven going coal concerns and two undeveloped leases in Elkhorn field, Kentucky, valued at about \$4,000,000, merged as Utilities Elkhorn Coal Co. Properties include mines Nos. 1, 2, 3, 4 and 5 of Beaver Mining Co., the Rogers Elkhorn mine and mine of Furnace Mining Co.

July 30—Maryland New River Coal Co. buys Nuttallburg mine, plant and equipment, at Nuttall, Fayette County, W. Va., from Fordson Coal Co.

July 31—Representatives of United Mine Workers and of Coal Operators' Association of Illinois meet at Chicago in first district wage conference. Similar meeting takes place two days later in Terre Haute, Ind., to negotiate scale for that field. Western Pennsylvania, Central Pennsylvania, Ohio and Iowa producers refuse to deal with union representatives.

August

Aug. 1—H. E. Pell, president of the Bell & Zoller Coal & Mining Co., Chicago, elected chairman of the board; G. D. Cowin, vice-president, elevated to the presidency, and Paul Weir, general superintendent of mines, made vice-president.

Aug. 4—Anthracite Boosters' Asso-

ciation opens one-week hard-coal exposition at Willow Grove Park, near Philadelphia, Pa.

Aug. 7—I.C.C. announces it will permit 10c. per ton rise in rates on lake cargo coal on Southern roads, agreed upon by Northern and Southern carriers as compromise solution of rate fight.

Aug. 11—Miners of Wayne district of Alberta vote to "suspend" work until agreement is reached with operators over introduction of screens in mines and recognition of Miners' Union of Canada.

Aug. 12—Estimate of U. S. Bureau of Mines places consumers' stocks of bituminous coal at 41,700,000 net tons as of July 1.

Aug. 13—John F. Daniel, formerly superintendent for the Consolidation Coal Co. at Jenkins and McRoberts, Ky., appointed chief of the State Department of Mines of Kentucky.

Aug. 13—Robert A. Quin, general manager, Susquehanna Collieries and Lytle Coal companies, is named vice-president of both companies, and Robert V. Randall, general superintendent, succeeds him as general manager.

Aug. 16—Anthracite Board of Conciliation goes on record as favoring motion by John Boylan, president of district 1, United Mine Workers, that a study be made of contract mining system, which caused factional discord resulting in resignation of Rinaldo Cappellini as district president.

Aug. 20-23—First place in mine-rescue contest and for combination first-aid and mine-rescue honors at seventh annual International First-Aid and Mine-Rescue meet, held at Butte, Mont., won by team of Northwestern Improvement Co., Roslyn, Wash.

Aug. 25—W. Gaston Caperton elected president of New River Coal Co., Slab Fork Coal Co., Scotia Coal & Coke Co. and the South Side Co., succeeding his father, G. H. Caperton, deceased. William G. Caperton, vice-president, New River Coal Co. and in charge of sales, made vice-president of the other three companies.

Aug. 27—Willis Branch mine of Willis Branch Coal Co., Willis Branch, W. Va., resumes operations after being closed more than a year.

Aug. 27-29—Mechanical loading, safety and the qualifications for successful officials claim major attention at annual summer meeting of Rocky Mountain Coal Mining Institute, held at Rock Springs, Wyo.

Aug. 30—Six lives lost from after-damp following explosion in No. 1 East mine at Crow's Nest Pass Coal Co.'s Coal Creek colliery, near Fernie, B. C.

September

Sept. 1—New wage contracts involving substantial reductions agreed upon by representatives of operators and district organizations of United Mine Workers in Illinois, the Southwest and central Ohio. Agreement entered into for two years between Rocky Mountain Fuel Co., operating in northern Colorado, and local union representatives increases day rates from \$6.77 to \$7.

Sept. 1—Andrew Matthey, president of district 7, United Mine Workers (the middle anthracite field of Pennsylvania), defeated for re-election by Michael Hartneady, of Nesquehoning, formerly Sheriff of Carbon County.

Sept. 11—Petition for repeal of anthracite tonnage tax by Legislature presented to Governor Fisher of Pennsylvania by 45 business and professional men from the hard-coal fields, members of Anthracite Co-operative Association.

Sept. 11—National Miners' Union organized in Pittsburgh, Pa., by insurgents from the United Mine Workers who launched "Save the Union" movement. Officers chosen by the new organization are: John J. Watt, Illinois, president; William Boyce (negro), Indiana, vice-president, and Patrick Toohey, secretary-treasurer.

King Coal's Calendar for 1928

Sept. 13—Excessive taxation, ill-advised though well-meant publicity, strikes and the growing use of substitutes cited as chief ills of anthracite industry in an address by Richard F. Grant, president, Lehigh Valley Coal Corporation, at a dinner in Wilkes-Barre, Pa., attended by 200 business and professional men.

Sept. 15—Ralph W. Clark, vice-president, Pilling & Co., elected vice-president and general sales agent of Hudson Coal Co. to succeed D. F. Williams, resigned.

Sept. 17-20—Second National Fuels Meeting, under auspices of fuels division of A.S.M.E., held at the Hotel Cleveland, Cleveland, Ohio, considers practical problems of fuel consumption as affected by furnace design and equipment, efficient combustion methods and proper coal preparation.

Sept. 18—Kansas City Coal Service Institute organized by operators and retailers at Kansas City, Mo., to educate public in proper consumption of coal and to assist in reducing smoke.

Sept. 21—New wage scale carrying substantial cuts becomes effective in Illinois following ratification vote of 26,838 for and 25,497 against by state organization of United Mine Workers.

Sept. 22—Third annual observance of West Virginia Safety Day, at Bluefield, W. Va., proves magnet for 180 first-aid teams as well as large number of prominent coal men and Governor Gore.

Sept. 23-Oct. 6—Fifteen hundred delegates representing 48 countries present 170 papers, two-thirds of them concerning coal, at World Fuel Conference in London, England.

Sept. 26—Executive committee working on proposed merger of coal properties in smokeless field of southern West Virginia, at meeting in New York City, decides to abandon efforts.

Sept. 28—Iowa operators and union miners compromise wage differences on a \$5.80 day scale, effective from Oct. 1, 1928, to April 1, 1930.

Sept. 28—John L. Lewis, international president, United Mine Workers, in statement at Scranton, Pa., urges agreement between anthracite operators and miners "guaranteeing the industry freedom from a strike in 1930 and an assured continuity of production for years thereafter."

Sept. 30—William H. Coverdale elected president of the Gulf States Steel Co., Birmingham, Ala., succeeding James Bowron, deceased.

October

Oct. 1—Superintendent of preparation is new position created by Hudson Coal Co., hard-coal producer; John S. Johnson named for the post.

Oct. 1—Rochester & Pittsburgh Coal Co., Indiana, Pa., reorganized following acquisition of Helvetia Coal Mining Co., which is a consolidation of the Pittsburgh Gas Coal Co., Cowanshannock Coal & Coke Co. and Brush Creek Coal Mining Co. Lucius W. Robinson retires as chairman of the board after 46 years in control.

Oct. 1-5—Progress in accident prevention and means of stimulating further efforts for safety stressed at annual congress of National Safety Council, held in New York City.

Oct. 11—Illinois Coal Operators' Labor Association formed to supersede Coal Operators' Association of Illinois. Joseph D. Zook resigns as vice-president and general manager of the O'Gara Coal Co. to devote his entire time to the new organization as president.

Oct. 12—New wage scale agreed upon by joint scale committee of United Mine Workers and operators of Wyoming at Cheyenne has basic day rate of \$6.72; pick mining, 85c. per ton; machine loaders, \$9; helpers, \$8. The day rate under the Jacksonville agreement was \$7.92.

Oct. 13—Walter H. Cunningham, pres-

ident, West Virginia Southern Coal Co., becomes president of Truax-Traer Coal Co. with offices in Chicago.

Oct. 15—Traffic bureau created by Anthracite Operators' Conference, with Andrew K. Morris as commissioner, having headquarters at 120 Broadway, New York City. Mr. Morris resigns position of vice-president and general manager of Pennsylvania Coal Co. and Hillside Coal & Iron Co. John C. Brydon succeeds Mr. Morris as vice-president of the Pennsylvania Coal Co. and affiliated mining interests.

Oct. 15—West Pennsylvania Coal Traffic Bureau organized to take over coal-rate activities performed by the Pittsburgh Operators' Lake Rate Committee, Pittsburgh Eastern Coal Rate Committee and Pittsburgh Northern Coal Rate Committee.

Oct. 18—Indiana coal operators and union miners reach agreement at Terre Haute on wages similar to the one in effect in Illinois, providing basic day rate of \$6.10 with 91c. a ton for pick mining. Miners register approval by 7,627 to 4,469.

Oct. 24—Anthracite Mine Workers of Pennsylvania, insurgent offspring of the United Mine Workers, granted a state charter at Harrisburg. Frank McGarry, Pittston, is president, with headquarters at Wilkes-Barre.

Oct. 27—Andrew Millar, general manager, Saunders Ridge Coal Co., Mercoal, Alberta, appointed chief inspector of mines for Alberta, succeeding John T. Stirling, resigned.

Oct. 29—Governor Fisher of Pennsylvania approves appointment of these inspectors of electrical equipment in coal mines, nominated by Secretary of Mines Walter H. Glasgow; G. Frank Newman, stationed at Uniontown; Clyde H. Maize, Greensburg; James T. Gatehouse, Johnstown, and Michael Lecorchick, Pittsburgh.

Oct. 30—Coal Trade Association of Indiana, embracing nearly 80 per cent of the state's tonnage organized to assume task of regaining lost markets and extending use of Indiana coal. Jonas Waffle, long active in association activities, elected managing director.

November

Nov. 9-10—Co-operation and mutual understanding to characterize relations of Illinois operators and mine workers under new scale is promise of representatives attending Illinois Coal Mining Institute meeting held at Benton, Ill.

Nov. 13—Consumers' stocks of bituminous coal, according to estimate by U. S. Bureau of Mines as of Oct. 1, total 41,100,000 net tons.

Nov. 14-16—Economic fundamentals convention theme of National Coal Association at eleventh annual meeting, at the Hotel Cleveland, Cleveland, Ohio.

Nov. 16—Truax-Traer Coal Co. announces issue of \$3,000,000 debentures and 100,000 shares of common stock to finance recent purchase of Black Servant Coal Co. in Illinois as well as contemplated acquisition of Cabin Creek Consolidated Coal Co. in West Virginia.

Nov. 16—Anthracite problems in relation to the future and lightning control discussed at joint meeting of Lehigh Valley Section of A.I.E.E. and Engineers' Society of Northeastern Pennsylvania, held at Pottsville.

Nov. 19—Coal companies in the Pennsylvania hard coal regions have the right to dismiss coal loaders whenever conditions of work and employment warrant, according to a ruling by C. P. Neill, umpire of the Anthracite Conciliation Board.

Nov. 19-24—Authorities on coal chemistry and technique from many nations take part in Second International Bituminous Coal Conference, at Carnegie Institute of Technology, Pittsburgh, Pa.

Nov. 23—New mine-rescue station opened by Harlan County Coal Opera-

tors Association at annual meeting held at Harlan, Ky.

Nov. 24—Union miners in southern Wyoming vote to accept reduced wage scale adopted by joint scale committee of operators and United Mine Workers. Michigan miners take similar action.

Nov. 26—Frost Research Laboratory, Norristown, Pa., engaged by Anthracite Operators' Conference to conduct study of improved methods of using anthracite fuel for domestic heating.

Nov. 27—Explosion in unused mine of Himler Coal Co. at Himlerville, Ky., kills president, general manager and mine superintendent of Glogora Coal Co., of Huntington, W. Va.

December

Dec. 1—Delbert H. Pape, formerly assistant secretary of the National Coal Association and later executive secretary of the Monongahela Coal Operators' Association, becomes assistant to the president of the Cosgrove-Meehan Coal Corporation, Johnstown, Pa.

Dec. 3—Dumpings of lake cargo coal for the season set new record with 33,119,111 net tons, exceeding previous mark, established a year ago, by about 400,000 tons.

Dec. 3—Safety, tippie design and mechanization are leading topics discussed at winter meeting of West Virginia Mining Institute, held at Beckley.

Dec. 5—Montana union, United Mine Workers, rejects new wage agreement providing basic day rate of \$7.19; loading machine operators, \$9.25; mining rate cut of 16c. per ton and reduction of 20 per cent in yardage and dead work.

Dec. 5-8—Mechanization transcended in interest all other topics considered at annual meeting of American Mining Congress, held at Washington, D. C.

Dec. 6—Harvey Cartwright, for the last two years president of district 11, United Mine Workers (Indiana), tenders resignation to accept position as labor commissioner of Indiana Bituminous Coal Operators' Association.

Dec. 7—Market research institute created by National Coal Association by correlating activities of a number of committees under chairmanship of Walter Barnum, president, Pacific Coast Co.

Dec. 8—Union miners of northern Wyoming reject proposed wage scale carrying day base rate of \$6.72 by vote of 521 to 461.

Dec. 11—John L. Lewis, international president, United Mine Workers; Philip Murray, vice-president, and Thomas Kennedy, secretary-treasurer, unanimously re-elected, being unopposed.

Dec. 14—Senate committee on interstate commerce begins open hearings on bill introduced by Senator Watson of Indiana to regulate soft-coal industry.

Dec. 14—Wage scale carrying day base rate of \$6.72, rejected by union miners of northern Wyoming Dec. 8, declared to be accepted scale by executive board of district 22 (Wyoming), United Mine Workers.

Dec. 18—Charges of rioting and inciting to riot, in connection with disorder at a meeting held at Renton, Pa., brought against John Brophy and Pat Toohey, leaders of "save the union" movement, dismissed when brought to trial in Pittsburgh (Pa.) court.

Dec. 31—Interstate Commerce Commission fails to take action on request of Pittsburgh and Ohio operators to suspend provisions in tariffs of Northern railroads providing for cancellation on Dec. 31 of notes in the tariffs under which refunds of 10c. per ton were made on lake cargo coal shipments during 1928 season of navigation. Failure to suspend permits differential of 35c. in favor of shipments from Northern fields, arranged by compromise between the Northern and Southern lines last summer, to become effective.